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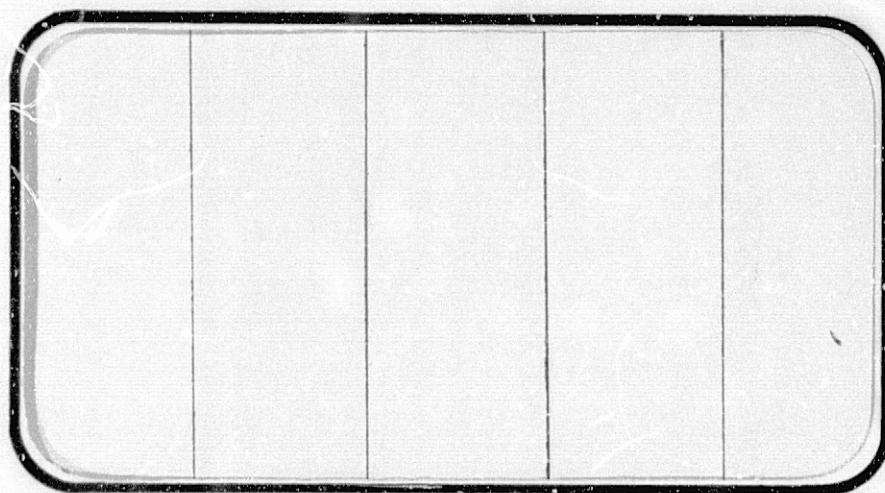
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(NASA-CR-141811) AN INVESTIGATION IN MSFC
14-INCH TWT TO DETERMINE THE STATIC
STABILITY CHARACTERISTICS OF 0.004-SCALE
MODEL (74-OTS) SPACE SHUTTLE VEHICLE 5
CONFIGURATION (1A33), VOLUME 1 (Chrysler

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SPACE SHUTTLE

AEROTHERMODYNAMIC DATA REPORT



JOHNSON SPACE CENTER

HOUSTON, TEXAS

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SPACE DIVISION



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VOLUME 1 OF 3

AN INVESTIGATION IN THE MSFC 14-INCH TWT
TO DETERMINE THE STATIC STABILITY CHARACTERISTICS
OF THE 0.004-SCALE MODEL (74-OTS) SPACE
SHUTTLE VEHICLE 5 CONFIGURATION (IA33)

by

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Prepared under NASA Contract Number NAS9-13247

by

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for

Engineering Analysis Division
Johnson Space Center
National Aeronautics and Space Administration
Houston, Texas

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AN INVESTIGATION IN THE MSFC 14-INCH TWT
TO DETERMINE THE STATIC STABILITY CHARACTERISTICS
OF THE 0.004-SCALE MODEL (74-OTS) SPACE
SHUTTLE VEHICLE 5 CONFIGURATION
(IA33)

by

E. C. Allen, Rockwell International

ABSTRACT

This report presents data for wind tunnel test (IA33) of a 0.004-scale orbiter, external tank, and solid rocket motor integrated vehicle model (74-OTS) in the MSFC Trisonic Wind Tunnel.

The primary test objective was to obtain data on the static stability characteristics in both pitch and yaw of the Shuttle Vehicle 5 over a Mach number range of 0.6 through 4.96. The effect on vehicle aerodynamic characteristics of tank and SRB nose shape, SRB nozzle shroud flare angle, and orbiter/ET fairing were investigated.

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- (A) CN, CLMF, CAF versus ALPHA
CABT, CN versus CLMF
CABE, CABS, CABO versus ALPHA
- (B) CY, CBL, CYN versus BETA
CY versus CYN
- (C) (A) + CAF, CABT, CN, CLMF versus MACH
- (D) (B) + CY, CBL, CYN versus MACH
- (E) CN, CLMF, CAF versus ALPHA
CN/DR, CLMDR, CAFDR versus MACH
- (F) CBL, CY, CYN versus BETA
CYDR, CYNDR, CBLDR versus MACH
- (G) CN, CLMF, CAF versus ALPHA
CN/DE, CLMDE, CAFDE versus MACH
- (H) CBL, CY, CYN versus BETA
CYDE, CYNDE, CBLDE versus MACH
- (I) CHEO, CHEI, CHBF versus ALPHA
- (J) CHEO, CHEI, CHBF versus BETA
- (K) CHR versus BETA
- (L) CN, CLMF, CAF versus ALPHA
CABT, CN versus CLMF
CABO, CABE versus ALPHA
CAF, CABT, CN, CLMF versus MACH

INTRODUCTION

The purposes of this test were: (1) to determine the static stability characteristics of the Shuttle Vehicle 5 configuration; (2) to determine the effect on the Vehicle 5 aerodynamic characteristics of ET and SRB nose shape, SRB nozzle shroud flare angle, orbiter to tank fairing, and sting location; (3) to provide flow visualization using thin film oil paint; and (4) to determine rudder, body flap, and inboard and outboard elevon hinge moments.

The mated vehicle model was mounted in three different ways: (1) the orbiter mounted on the balance with the SRB's attached to the tank and the tank in turn attached to the orbiter; (2) the tank mounted on the balance (with the sting protruding through the tank base) with the SRB's and orbiter attached to the tank, and (3) with the tank mounted on the balance and the balance in turn supported by a forked sting entering the nozzle of each SRB, extending forward into the SRB's then crossing over to the tank to provide a balance socket.

Data were obtained for Mach numbers from 0.6 through 4.96 at angles-of-attack and -sideslip from -10 to 10 degrees.

The Rockwell designation for this model is 74-OTS and the NASA Series number is IA33. The MSFC test number is TWT-594 A/B.

This report consists of 3 volumes arranged in the following manner:

- VOLUME 1 - Plotted Data Figures 4-12
- VOLUME 2 - Plotted Data Figures 13-26
- VOLUME 3 - Tabulated Source Data

NOMENCLATURE

<u>Symbol</u>	<u>Plot Symbol</u>	<u>Definition</u>
A_b		base area, in. ²
A_{be}		tank base area, in. ²
A_{bf}		body flap area, in. ²
A_{bf}		orbiter/tank fairing base area, in. ²
A_{bo}		orbiter base area, in. ²
A_{bs}		SRB base area, in. ²
b_{ref}	BREF	reference span, in. ²
c.g.		center of gravity
CAB_E	CABE	tank base axial force coefficient
CAB_F	CABF	orbiter/tank fairing axial force coefficient
CAB_O	CABO	orbiter base axial force coefficient
CAB_S	CABS	SRB base axial force coefficient
CA_f	CAF	forebody axial force coefficient
CA_T	CA	total axial force coefficient
C_ℓ	CBL	rolling moment coefficient in body axis system
C_m	CLM	pitching moment coefficient
C_{m_U}	CLMU	uncorrected pitching moment coefficient
C_n	CYN	yawing moment coefficient in the body axis system

NOMENCLATURE (Continued)

<u>Symbol</u>	<u>Plot Symbol</u>	<u>Definition</u>
C_{m_f}	CLMF	forebody pitching moment coefficient
C_{A_B}	CABT	total base axial force coefficient
	CN/DR	normal force coefficient due to rudder deflection
	CLM/DR	pitching moment coefficient due to rudder deflection
	CAF/DR	forebody axial force due to rudder deflection
	CYDR	side force coefficient due to rudder deflection
	CYNDR	yawing moment coefficient due to rudder deflection
	CBLDR	rolling moment coefficient due to rudder deflection
	CN/DE	normal force coefficient due to elevon deflection
	CLMDE	pitching moment coefficient due to elevon deflection
	CAFDE	forebody axial force coefficient due to elevon deflection
	CYDE	side force coefficient due to elevon deflection
	CYNDE	yawing moment coefficient due to elevon deflection
	CBLDE	rolling moment coefficient due to elevon deflection
C_{heo}	CHEO	outboard elevon hinge moment coefficient
C_{hei}	CHEI	inboard elevon hinge moment coefficient
C_{hbf}	CHBF	body flap hinge moment coefficient
C_{hr}	CHR	rudder hinge moment coefficient

NOMENCLATURE (Continued)

<u>Symbol</u>	<u>Plot Symbol</u>	<u>Definition</u>
CN	CN	normal force coefficient
CN _{BF}	CNBF	body flap upper surface normal force coefficient, adjusted to freestream static pressure
CN ₀	CNBO	orbiter base normal force coefficient
CN _U	CNU	uncorrected normal force coefficient
CPB _{BF}	CPBBF	body flap upper surface pressure coefficient
CPB _E	CPBE	tank base pressure coefficient
CPB _F	CPBF	orbiter/tank fairing base pressure coefficient
CPB ₀	CPBO	orbiter base pressure coefficient
CPB _S	CPBS	SRB base pressure coefficient
C _y	CY	side force coefficient (body or stability axis system)
l _{ref}	LREF	reference length, in.
M	MACH	Mach number
MRP	MRP	moment reference point
	XMRP	moment reference point on x-axis
	YMRP	moment reference point on y-axis
	ZMRP	moment reference point on z-axis
P _∞		freestream static pressure, psi
P _{b_{bf}}		body flap upper surface pressure, psi

NOMENCLATURE (Continued)

<u>Symbol</u>	<u>Plot Symbol</u>	<u>Definition</u>
P_{be}		tank base pressure, psi
P_{bf}		orbiter/tank fairing base pressure, psi
P_{bo}		orbiter base pressure, psi
P_{bs}		SRB base pressure, psi
P_t		total pressure, psi
q	Q(PSI)	dynamic pressure, psi
RN/L	RN/L	Reynolds number per unit length; million/ft.
S_{ref}	SREF	reference area, in. ²
S_{bfref}		body flap reference area, in. ²
S_{eref}		elevon reference area, in. ²
S_{rref}		rudder reference area, in. ²
T		temperature, °F
α	ALPHA	angle-of-attack, angle between the projection of the wind X_w -axis on the body X, Z-plane and the body X-axis; deg.
β	BETA	sideslip angle, angle between the wind X_w -axis and the projection of this axis on the body X, Z-plane; deg.
δ		control surface deflection angle; deg. positive deflections are:
δ_a	AILRON	aileron - left aileron trailing edge down
δ_e	ELEVTR	elevator - trailing edge down

NOMENCLATURE (Concluded)

<u>Symbol</u>	<u>Plot Symbol</u>	<u>Definition</u>
δ_{BF}	BDFLAP	body flap - trailing edge down
δ_{SB}	SPDBRK	speed brake
δ_r	RUDDER	rudder - trailing edge left
$\Delta\delta_r$	DRUDDR	rudder deflection increment
$\Delta\delta_e$	DELEVN	elevator deflection increment
M_g		pitching moment, in.-lb.

SUBSCRIPTS

b_e	tank base
b_f	body flap
b_o	orbiter base
b_s	SRB base
e	elevator or elevon
r	rudder
SB	speed brake
$e_L \text{ \& } e_R$	elevon left and right
t	total conditions
w	wind
ref	reference conditions
∞	freestream conditions

CONFIGURATIONS INVESTIGATED

The model geometry (0.004-scale) is shown in figure 2a. The model was constructed entirely of stainless steel.

As described in the introduction, the model was mounted on the sting/balance combination in three different ways; (1) the orbiter mounted on the balance with the SRB's attached to the tank and the tank in turn attached to the orbiter (see figure 2a); (2) the tank mounted on the balance (with the sting protruding through the tank base) with the SRB's and orbiter attached to the tank (see figure 2b); and (3) with the tank mounted on the balance and the balance in turn supported by a forked sting entering the nozzle of each SRB, extending forward into the SRB's then crossing over to the tank to provide a balance socket (see figure 2c).

The model had positionable elevons and rudders which could be deflected (by installing a control surface set to the desired angle) to the following angles.

$$\delta_{eL} \text{ \& } \delta_{eR} \text{ (deg)} = -5, 0, 10, 15$$

$$\delta_r \text{ (deg)} = 0, -15, -20 \text{ for } \delta_{SB} = 0$$

The 0° rudder and the body flap were instrumented to provide hinge moments. The $\delta_{eL} = 0^\circ$ elevon was split and the inboard and outboard sections were both instrumented to provide hinge moments.

The model was fabricated in conformance with the lines drawings as listed below.

Orbiter

Forward Body and Cabin	VL70-000202C
Mid-body-wing/glove fairing	VL70-000200B
Aft body	VL70-000203
Vertical tail	VL70-000146A
Wing tip	VL70-006092
OMS/RCS Pods	VL70-008457
Tank	VL78-000041C
SRB	VL77-000066

CONFIGURATIONS INVESTIGATED (Continued)

The following nomenclature was used to designate model parts:

<u>Component</u>	<u>Definition</u>
<u>Orbiter</u>	
B62	fuselage - per VL70-000200B, 202C, & 203
C12	canopy - per VL70-000202C
E26	elevon - per VL70-000202B
F10	body flap - per VL70-000200B
W127	wing - per VL70-000200B
M14	OMS pods - per VL70-008457
N28	OMS nozzle - per VL70-008457
V8	vertical - per VL70-000146A
R5	rudder - per VL70-000146A
<u>Tank</u>	
AT16	attach structure, front ORB/ET - per SK-H-4011
AT25	strengthened attach structure, left rear ORB/ET - per VL78-000062B
AT26	strengthened attach structure, right rear ORB/ET - per VL78-000062B
AT24	attach structure, front ORB/ET (ET alone) - per SK-H-4011
FL5	LOX feed line ET/ORB - per VL78-000062A
FL6	LH2 pressure line ET/ORB - per VL78-000062A
FL9	LH feed line ET/ORB - per VL78-000062A

CONFIGURATIONS INVESTIGATED (Continued)

FR6	umbilical door fairing support - per VL78-000062A
PT12	tank lightning rod - per VL78-000062A
PT13	LOX recirculation line - per VL78-000062A
PT14	LOX pressure line - per VL78-000062A
PT20	LOX pressure line and electrical conduit - per VL78-000062A
PT21	tank base extension
T20	tank - per VL78-000041C
T27	tank with 1203 in. radius ogive nose, LOX pressure line, and electrical conduit

SRB

PS7	attach rings and rear structural ring - per VL77-000066
PS8	electrical tunnel
PS9	tie down structure - per VL77-000066
S14	20° aft skirt
S15	28° nose shape
S18	SRB baseline - per VL70-000066

The following abbreviations were used to describe the model configurations tested:

T1P1	Tank + protuberances
S1P2	SRB's + protuberances
O1	Orbiter
T2	Tank long ogive nose

CONFIGURATIONS INVESTIGATED (Concluded)

S3	SRB 29° nose shape
F2	Orbiter/tank fairing
S2	SRB 20° aft skirt
E1	Tank base extension

Details of the model components are given in table III. The various configuration components are illustrated by figure as indicated below:

- 1) Tank Protuberances, figure 2d and figure 2e.
- 2) Tank Long Ogive Nose and Tank Base Extension, figure 2f.
- 3) Orbiter/Tank Fairing, figure 2g.
- 4) SRB Protuberances, figure 2h.
- 5) SRB Alternate Nose Shape and Aft Skirt Flare, figure 2i.

INSTRUMENTATION

Balance number 239 was used throughout the test regardless of whether the balance was installed in the orbiter or in the tank. The model-balance combination for the balance in the orbiter tests, was mounted to the tunnel pitch sector using the MSFC 5 degree offset sting with a straight extension. During the portion of the test for which the balance was in the tank and supported by the forked sting, the forked sting was mounted in the sector using the MSFC S-2 straight extension. When the balance was in the tank supported by a straight sting, the straight sting was mounted directly into the sector.

Pressure transducers were used to measure base pressures. Depending upon the model configuration as many as five base pressures were recorded. The configuration and associated base pressure measurement requirements are given below:

Balance in Orbiter (see figure 2j)

- 1) Orbiter base pressure

$$P_{b_o} = 1, 2, 3, 5 \text{ (all manifolded together)}$$

- 2) Body flap base pressure

$$P_{b_{bf}} = 4$$

- 3) Tank base pressure

$$P_{b_e} = 6, 7, 8 \text{ (all manifolded together)}$$

- 4) SRB base pressure

$$P_{b_s} = 9, 10 \text{ (manifolded together)}$$

Balance in Orbiter + FRg (see figure 2j)

- 1)
 - 2)
 - 3)
 - 4)
- Same as listed above

- 5) Fairing base pressure

$$P_{b_f} = 11$$

INSTRUMENTATION (Concluded)

Balance in Tank (straight sting, see figure 2k)

- 1)
 - 2)
 - 3)
 - 4)
- } Same as listed above

Balance in Tank (forked sting, see figure 2l)

- 1)
 - 2)
 - 3)
- } Same as listed above

- 4) SRB base pressure

$$P_{bS} = 9$$

TEST FACILITY DESCRIPTION

The Marshall Space Flight Center 14" x 14" Trisonic Wind Tunnel is an intermittent blowdown tunnel which operates by high pressure air flowing from storage to either vacuum or atmospheric conditions. A Mach number range from .2 to 5.85 is covered by using two interchangeable test sections. The transonic section permits testing at Mach 0.20 through 2.50 and the supersonic section permits testing at Mach 2.74 through 5.85. Mach numbers between .2 and .9 are obtained by using a controllable diffuser. The range from .95 to 1.3 is achieved through the use of plenum suction and perforated walls. Mach numbers of 1.44, 1.93 and 2.50 are produced by interchangeable sets of fixed contour nozzle blocks. Above Mach 2.50 a set of fixed contour nozzle blocks are tilted and translated automatically to produce any desired Mach number in .25 increments.

Air is supplied to a 6000 cubic foot storage tank at approximately -40°F dew point and 500 psi. The compressor is a three-stage reciprocating unit driven by a 1500 hp motor.

Tunnel flow is established and controlled with a servo-actuated gate valve. The controlled air flows through the valve diffuser into the stilling chamber and heat exchanger where the air temperature can be controlled from ambient to approximately 180°F. The air then passes through the test section which contains the nozzle blocks and test region.

Downstream of the test section is a hydraulically controlled pitch sector that provides a total angle of attack range of 20° (+10°). Sting offsets are available for obtaining various maximum angles of attack up to 90°.

TEST PROCEDURES

For the oil flow portion of the test, the model was prepared by filling the cracks and openings with polyester resin putty, finishing with thin coats of white lacquer for color, and sealing with a thin coat of clear lacquer to protect the color coat from contamination by the artist's oil pigment used for flow visualization.

The model was dual sting mounted on two MSFC 0.5 in. dummy balances, one installed in the external tank and the other in the orbiter. Stings were such that the orbiter and tank assembly could be separated easily for preparation, photography and clean up.

Black and white photographs of the flow pattern on the top, side and bottom of the orbiter and of the top of the tank assembly were taken.

The oil flows were obtained in accord with the thin film technique with artist's oil pigments as described in the SRO Rockwell Internal Letter from P. Hawthorne to R. Crowder, dated 28 October 1973.

Shadowgraphs of the model upright and rolled left 90° were made. These photos were taken during the force runs whenever possible and are available on request from the Aerodynamics Group, Shuttle Aero Sciences, Space Division, Rockwell International.

DATA REDUCTION

All model forces and moments (measured by the balance 239) were resolved in the body axis system and presented in the form of nondimensional coefficients. Data were corrected for weight tares and sting deflections. Data were also adjusted to be representative of a model with freestream static pressure acting on the orbiter base, orbiter body flap upper surface, External Tank base, and Solid Rocket Booster base. Orbiter, ET and SRB base pressures were recorded using tubes attached to the model sting with tube openings located near the base region. Comparison of base pressures sensed by these tubes with base pressures measured during other tests using pressure orifices located in the model skin indicated the tubes were not sensing an accurate base pressure. This error was due to the tube locations not being close enough to the model base, therefore measuring pressures in a region with appreciable flow velocities. Orbiter and ET base pressures were corrected for this (tube - tap) effect using the data presented in figure 2m, which was derived from a comparison of IA33 base pressures with base pressures from test IA53. Orbiter body flap upper surface pressures were determined using test IAB1 data in addition to IA33 data, as shown on the curve in figure 2n. Coefficients were non-dimensionalized as shown below.

INTEGRATED VEHICLE (TSO)

Balance Coefficients (Balance either in the orbiter or the external tank)

$$CNU = \frac{F_N}{qS_{ref}}, \text{ normal force coefficient uncorrected for base pressure forces.}$$

$$CN = CNU - CNB_0 - CN_{BF}, \text{ normal force coefficient corrected for orbiter base pressure acting on the orbiter base and body flap.}$$

$$CAT = \frac{F_A}{qS_{ref}}, \text{ total axial force coefficient.}$$

$$CAF = CAT - CAB_0 - CAB_S - CAB_E, \text{ forebody axial force coefficient.}$$

$$CY = \frac{F_y}{qS_{ref}}, \text{ side force coefficient.}$$

$$CLMU = \frac{M_y}{qS_{ref} l_{ref}}, \text{ pitching moment coefficient uncorrected for base pressure forces.}$$

DATA REDUCTION (Continued)

$$CLM = CLMU + CNB_0 \frac{x_1}{l_{ref}} + CN_{BF} \frac{x_2}{l_{ref}} - CAB_0 \frac{z_1}{l_{ref}}$$

pitching moment coefficient corrected for orbiter base pressure acting on the orbiter base and body flap.

$$CYN = \frac{M_z}{q S_{ref} b_{ref}}, \text{ yawing moment coefficient.}$$

$$CBL = \frac{M_x}{q S_{ref} b_{ref}}, \text{ rolling moment coefficient.}$$

$$CNB_0 = -CPB_{0IA33} \frac{A_{bORB}}{S_{ref}} \tan i_b, \text{ normal force component coefficient of orbiter base drag.}$$

$$CN_{BF} = -CPB_{bf} \frac{S_{bfref}}{S_{ref}}, \text{ body flap normal force coefficient.}$$

$$CAB_0 = -CPB_{0IA33} \frac{A_{bORB}}{S_{ref}}, \text{ axial force component coefficient of orbiter base drag.}$$

$$CAB_E = -CPB_{EIA33} \frac{A_{be}}{S_{ref}}, \text{ tank base axial force coefficient.}$$

$$CAB_S = -CPB_S \frac{A_{bs}}{S_{ref}}, \text{ SRB base axial force coefficient.}$$

Where:

$$CPB_{0IA33} = \left(\frac{P_{b_0} - P_{\infty}}{q} \right)_{\text{MEASURED}} + \Delta CPB_0$$

ΔCPB_0 is from figure 2m

DATA REDUCTION (Continued)

$$CPBE_{IA33} = \left(\frac{P_{be} - P_{\infty}}{q} \right)_{\text{MEASURED}} + \Delta CPBE$$

$\Delta CPBE$ is from figure 2m

$CPB_{bf} = C_{p_{bf}}$ as obtained from the curve on figure 2n for all datasets except A1C005, A1C006, A1C023 and A1C024

$CPB_{bf} = CPB_{0IA33}$ for datasets A1C005, A1C006, A1C023 and A1C024

INTEGRATED VEHICLE PLUS ORBITER/ET FAIRING (TSO + F)

(Balance in the Orbiter)

All coefficients were computed as indicated above except for the following:

$CAF = CAT - CAB_0 - CAB_S - CAB_E - CAB_F$, forebody axial force coefficient

$$CLM = CLM_U + CNB_0 \frac{X_1}{l_{ref}} + CNB_F \frac{X_2}{l_{ref}} - CAB_F \frac{Z_2}{l_{ref}} - CAB_0 \frac{Z_1}{l_{ref}}$$

pitching moment coefficient corrected for base pressure acting on the orbiter base, body flap, and orbiter/ET fairing

$$CABF = -CPB_F \frac{A_{bf}}{S_{ref}}, \text{ fairing base axial force coefficient}$$

$$\text{Where: } CPB_F = \frac{P_{bf} - P_{\infty}}{q}, \text{ fairing base pressure coefficient}$$

SECOND STAGE VEHICLE (T0)

(Balance in the external tank)

All coefficients were computed as indicated above except for the following:

$CAF = CAT - CAB_0 - CAB_E$, forebody axial force coefficient

DATA REDUCTION (Continued)

EXTERNAL TANK ALONE (T)

$$C_N = \frac{F_N}{qS_{ref}}, \text{ normal force coefficient}$$

$$C_{AF} = C_{AT} - C_{AB_E}, \text{ forebody axial force coefficient}$$

$$C_{LM} = \frac{M_y}{qS_{ref} l_{ref}}, \text{ pitching moment coefficient}$$

Hinge Moment Coefficients

Rudder

$$C_{h_r} = \frac{HM_r}{qS_{rref} \bar{c}_r}$$

Where: C_{h_r} = rudder hinge moment coefficient

HM_r = rudder hinge moment

S_{rref} = rudder reference area

\bar{c}_r = rudder reference length

Elevon, Outboard

$$C_{h_{eo}} = \frac{HM_{eo}}{qS_{e_{ref}} \bar{c}_e}$$

Where: $C_{h_{eo}}$ = outboard elevon hinge moment coefficient

HM_{eo} = outboard elevon hinge moment

$S_{e_{ref}}$ = elevon reference area

\bar{c}_e = elevon reference length

DATA REDUCTION (Continued)

Elevon, Inboard

$$C_{hei} = \frac{HM_{ei}}{qS_{e_{ref}} \bar{c}_e}$$

Where: C_{hei} = inboard elevon hinge moment coefficient

HM_{ei} = inboard elevon hinge moment

Body Flap

$$C_{h_{bf}} = \frac{HM_{bf}}{qS_{bf_{ref}} \bar{c}_{bf}}$$

Where: $C_{h_{bf}}$ = body flap hinge moment coefficient

HM_{bf} = body flap hinge moment

$S_{bf_{ref}}$ = body flap reference area

\bar{c}_{bf} = body flap reference length

Model reference dimensions used in the data reduction are:

<u>PARAMETER</u>	<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Reference Areas		
S_{ref} (wing)	2690.00 ft. ²	6.198 in. ²
$S_{r_{ref}}$	101.15 ft. ²	0.233 in. ²
$S_{e_{ref}}$	210.00 ft. ²	0.484 in. ²
$S_{bf_{ref}}$	142.6 ft. ²	0.329 in. ²

DATA REDUCTION (Continued)

<u>PARAMETER</u>	<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Reference Lengths		
$\lambda_{ref} = b_{ref}$	1290.0 in.	5.160 in.
λ_{bf} (distance from CG to body flap)	1365.0 in.	5.46 in.
\bar{c}_r	73.2 in.	0.293 in.
\bar{c}_e	90.7 in.	0.363 in.
\bar{c}_{bf}	81.0 in.	0.324 in.
Moment Reference Point from ET base on ET \bar{c}_L	1199.8 in.	4.799 in.
Base Areas		
Orbiter (A_{b_o})	314.10 ft. ²	0.724 in. ²
Orbiter ($A_{b_{oms}}$)	122.57 ft. ²	0.282 in. ²
$A_{b_{ORB}}$	436.7 ft. ²	1.006 in. ²
Tank (A_{b_e})	597.6 ft. ²	1.377 in. ²
Fairing (A_{bf})	79.7 ft. ²	0.184 in. ²
SRB (2)		
A_{b_s}		
S_1 and S_3 (baseline)	402.1 ft. ²	0.926 in. ²
S_2 (20° flare)	498.2 ft. ²	1.148 in. ²

DATA REDUCTION (Concluded)

- i_b = 14.75°, average orbiter base slant angle.
- x_1 = 5.052 in., axial moment arm for orbiter base drag.
- x_2 = 5.346 in., axial moment arm for body flap.
- z_1 = 1.344 in., vertical moment arm for orbiter base drag.
- z_2 = 0.730 in., vertical moment arm for fairing base drag.

TEST: IA-33 (TWT-594)

TABLE I.

DATE: 4/24/74

TEST CONDITIONS

MACH NUMBER	REYNOLDS NUMBER (per unit length)	DYNAMIC PRESSURE (pounds/sq. inch)	STAGNATION TEMPERATURE (degrees Fahrenheit)	STAGNATION PRESSURE (pounds/sq inch)
0.6	5.0×10^6	4.35	100	22
0.8	6.0	6.45	100	22
0.9	6.2	7.36	100	22
0.95	6.4	7.74	100	22
1.0	6.5	8.14	100	22
1.10	6.6	9.09	100	22
1.2	6.7	10.68	100	22
1.25	6.7	11.48	100	22
1.46	6.5	9.47	100	22
1.96	7.0	10.20	100	28
2.99	4.0	5.19	140	30
4.96	4.8	3.07	140	90

BALANCE UTILIZED:

MSFC 239

	CAPACITY:	ACCURACY:	COEFFICIENT TOLERANCE:
NF	<u>200 lbs.</u>	<u>±1.0 lb.</u>	<u>± 0.15</u>
SF	<u>100 lbs.</u>	<u>±0.5 lb.</u>	<u>± 0.08</u>
AF	<u>50 lbs.</u>	<u>±0.25 lb.</u>	<u>± 0.04</u>
PM	<u>196 in.lbs.</u>	<u>±1.0 in.lb.</u>	<u>± 0.18</u>
RM	<u>98 in.lbs</u>	<u>±0.5 in.lb.</u>	<u>± 0.09</u>
YM	<u>50 in.lbs</u>	<u>±0.2 in.lb.</u>	<u>± 0.05</u>

COMMENTS:

Accuracy based on ±0.5% of balance capacity.
Tolerance based on q=10 psi.

TABLE II.

TEST: MSFC TWT 594 (IA33)								DATA SET/RUN NUMBER COLLATION SUMMARY												DATE: 9 May - 21 June, 1974											
DATA SET IDENTIFIER	CONFIGURATION	SCHED.		PARAMETERS/VALUES				NO. OF RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE)																						
		α	β	$\delta\alpha$	$\delta\beta$				0.6	0.8	0.9	1.10	1.25	1.46	1.96	2.99	4.96	10.5													
P1E001	T ₁ P ₁	A	0	-	-			7	1		2	3	4		18	237	23														
002	↓	O	B	-	-			7	16		15	13	14		17	240	24														
003	T ₁ P ₁ S ₁ P ₂	O	B	-	-			7	9		10	11	12		20	259	21														
004	↓	A	0	-	-			7	8		7	6	5		19	233	22														
005	T ₁ P ₁ ϕ_1	A	0	0	0			7	122		123	125	124		133	167	106														
006	↓	O	B	0	0			7	121		120	118	119		134	166	105														
007	T ₁ P ₁ S ₁ P ₂ ϕ_1	A	0	0	0			10	130	129	128	126	127	107	122	108	127	131													
008		O	B	0	0			10	115	114	113	117	112	111	135	104	103	116													
009		S	B	0	0			9	159	158	157	155	156	141	136	160	161														
010		-S	B	0	0			9	145	144	143	146	142	150	139	165	164														
011		A	0	-15	0			6	49		50	52	51		78		81														
012		S	B	-15	0			6	217		218	220	219		184		181														
013		-S	B	-15	0			6	232		231	229	230		185		180														
014		A	0	-20	0			6	56		55	53	54		79		80														
015		S	B	-20	0			6	224		223	221	222		183		182														
016		-S	B	-20	0			6	225		226	228	227		186		179														
017		A	0	0	0			9	39	40	41	43	42	48	30	26	25														
018	↓	O	B	0	0			6	47		46	44	45		29		28														
		1	7	13	19	25	31	37	43	49	55	61	67	75	76																
CN		CLME, CY, CYN, CBL, CAF, CNBO, CABO, CABS, CABE, IDVAR (1) IDVAR (2) NDV																													
		COEFFICIENTS																													
α OR β		$\Delta A = -10$ TO 10° ; $\Delta \alpha = 2^\circ$																													
SCHEDULES		β $B = -10$ TO 10° ; $\Delta \beta = 2^\circ$																													

TABLE II. (Continued)

TEST: MSFC TWT 594 (TA33)				DATA SET/RUN NUMBER COLLATION SUMMARY										DATE :				
DATA SET IDENTIFIER	CONFIGURATION	SCHED.		PARAMETERS/VALUES				NO. OF RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE)									
		α	β	δr	δe				0.6	0.8	0.9	1.10	1.25	1.46	1.96	2.99	4.96	
R1C 019	T1 P1 S1 P2 ϕ 1	A	0	0	0			8	244	243	242	245	241	262	260		264	
020	↓	0	B	0	0			6	257		256	254	255		259		265	
021	T2 P1 S3 P2 ϕ 1 F2	A	0	0	0			9	96	95	94	93	97	101	87	98	79	
022	↓	0	B	0	0			6	91		90	92	89		88		100	
023	T1 P1 ϕ 1	5	B	0	0			6	151		152	154	153		137		162	
024	↓	-5	B	0	0			6	150		149	147	148		138		163	
025	T1 P1 S2 P2 ϕ 1	A	0	0	0			9	57	58	59	61	60	110	77	83	82	
026	↓	0	B	0	0			6	65		64	62	63		76		102	
* 027	T1 P1 S1 P2 ϕ 1	A	0	0	-5													
* 028		0	B	0	-5													
029		A	0	0	10			5	248		247	246	249		261			
030		0	B	0	10			5	252		251	253	250		258			
* 031		A	0	0	15													
* 032		0	B	0	15													
033		0	B	-15	0			6	66		67	69	68		75		177	
034	↓	↓	↓	-20	0			6	73		72	70	71		74		170	
035	T1 P1 S3 P2 ϕ 1 F2	A	0	0				2								86	85	
036	↓	0	B	↓	↓			1									84	
1 7 13 19 25 31 37 43 49 55 61 67 75 76																		

TABLE II. (Continued)

TEST: 115F-1 TWT 574 (2A33)		DATA SET/RUN NUMBER COLLATION SUMMARY										DATE:					
DATA SET IDENTIFIER	CONFIGURATION	SCHED.		PARAMETERS/VALUES				NO. OF RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE)								
		α	β	P_r	P_e												
R12 037	$\emptyset 1$	A	C	0	0			9	172	171	170	168	169	173	174	175	176
038	T, P, S, P2 $\emptyset 1$	↓	↓		-5			5	200		199	197	198		187		
039		O	B		↓			5	195		194	196	193		192		
040		A	C		10			5	201		202	204	203		188		
041		O	B		↓			5	208		207	205	206		191		
042		A	O		15			5	216		215	213	214		189		
043	↓	O	R		↓			5	209		210	212	211		190		
✓ 044	$\emptyset (-\emptyset MS PODS)$	A	O	✓	0			4	233		234	236	235				

TEST RUN NUMBERS

1 7 13 19 25 31 37 43 49 55 61 67 75 76

COEFFICIENTS
IDVAR (1) IDVAR (2) IDV

α OR β _____

SCHEDULES _____

TABLE II. (Continued)

TEST: MSFC TWT 594 (IA 33)		DATA SET RUN NUMBER COLLATION SUMMARY										DATE:						
DATA SET IDENTIFIER	CONFIGURATION	SCHD.		PARAMETERS/VALUES				NO. OF RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE)									
		α	β	δ_r	δ_e				0.6	0.8	0.9	1.10	1.25	1.44	1.76	2.99	4.76	1.05
RIC 101	$T_1 P_1$	A	0	-	-			7	1		2	3	4		18	237	23	
102	↓	0	B	-	-			7	16		15	13	14		17	240	24	
103	$T_1 P_1 S_1 P_2$	0	B	-	-			7	9		10	11	12		20	239	21	
104	↓	A	0	-	-			7	8		7	6	5		19	238	22	
105	$T_1 P_1 \phi_1$	A	0	0	0			7	122		123	125	124		133	167	106	
106	↓	0	B	0	0			7	121		120	118	119		134	166	105	
107	$T_1 P_1 S_1 P_2 \phi_1$	A	0	0	0			10	130	129	128	126	127	109	132	108	107	131
108		0	B	0	0			10	115	114	113	117	112	111	135	104	103	116
109		5	B	0	0			9	159	158	157	155	156	141	136	160	161	
110		-5	B	0	0			9	145	144	143	146	142	140	139	165	164	
111		A	0	-15	0			6	49		50	52	51		78		81	
112		5	B	-15	0			6	217		218	220	219		184		181	
113		-5	B	-15	0			6	232		231	229	230		185		180	
114		A	0	-20	0			6	56		55	53	54		79		80	
115		5	B	-20	0			6	224		223	221	222		183		182	
116		-5	B	-20	0			6	225		226	228	227		186		179	
117		A	0	0	0			9	39	40	41	43	42	48	30	26	25	
Y 118	Y	0	B	0	0			6	47		46	44	45		29		28	

1	7	13	19	25	31	37	43	49	55	61	67	75	76
CUBF	CABF												0.2
α OR β SCHEDULES		COEFFICIENTS $\delta A = -10 \text{ TO } 10^\circ$; $\delta \alpha = 2^\circ$ $\delta B = -10 \text{ TO } 10^\circ$; $\delta \beta = 2^\circ$											
		IDVAR (1) IDVAR (2) NDV											

TABLE II. (Continued)

TEST : <u>MSFC TWT 594 (IA33)</u>		DATA SET/RUN NUMBER COLLATION SUMMARY										DATE :								
DATA SET IDENTIFIER	CONFIGURATION	SCHD.		PARAMETERS/VALUES				NO. OF RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE)											
		α	β	δ_r	δ_c				0.6	0.8	0.9	1.10	1.25	1.46	1.96	2.99	4.96			
<u>R1C 119</u>	<u>T₁ P₁ S₁ P₂ θ_1</u>	A	0	0	0			8	244	243	242	245	241	262	260		264			
120	↓	0	B					6	257		256	254	255		259		265			
121	<u>T₂ P₁ S₃ P₂ θ_1 F₂</u>	A	0					9	96	95	94	93	97	101	87	98	99			
122	↓	0	B					6	91		90	92	89		88		100			
123	<u>T₁ P₁ θ_1</u>	5	B					6	151		152	154	153		137		162			
124	↓	-5	B					6	150		149	147	148		138		163			
125	<u>T₁ P₁ S₂ P₂ θ_1</u>	A	0					9	57	58	59	61	60	110	77	83	82			
126	↓	0	B		✓			6	65		64	62	63		76		102			
* 127	<u>T₁ P₁ S₁ P₂ θ_1</u>	A	0		-5															
* 128		0	B		-5															
129		A	0		10			5	248		247	246	249		261					
130		0	B		10			5	252		251	253	250		258					
* 131		A	0		15															
* 132		0	B	✓	15															
133		0	B	-15	0			6	66		67	69	68		75		177			
134	↓	0	B	-20				6	73		72	70	71		74		178			
135	<u>T₁ P₁ S₃ P₂ θ_1 F₂</u>	A	0	0				2								86	85			
↓ 136	↓	0	B	0	✓			1									84			
		1	7	13	19	25	31	37	43	49	55	61	67	73	76					
COEFFICIENTS																		IDVAR (1)	IDVAR (2)	NDV
α OR β																				
SCHEDULES																				

TABLE II. (Continued)

[illegible]

TABLE II. (Continued)

TEST: MSFC TWT 594 (IA33)		DATA SET/RUN NUMBER COLLATION SUMMARY										DATE:				
DATA SET IDENTIFIER	CONFIGURATION	SCHD.		PARAMETERS/VALUES		NO. OF RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE)									
		α	β	S_r	S_e		0.6	0.8	1.0	1.25	1.46	1.76	2.29	4.96	1.05	
R1C 201	T, P_1	A	C	-	-	7	1		2	3	4		18	237	23	
202	↓	O	B	-	-	7	16		15	13	14		17	240	24	
203	T, P_1, S_1, P_2	O	B	-	-	7	9		10	11	12		20	239	21	
204	↓	A	O	-	-	7	8		7	6	5		19	238	22	
205	T, P, ϕ_1	A	O	O	O	7	122		123	125	124		133	167	106	
206	↓	O	B	O	O	7	121		120	118	119		134	166	105	
207	T, P, S_1, P_2, ϕ_1	A	O	O	O	10	130	129	128	126	127	109	132	108	107	131
208		O	B	O	O	10	115	114	113	117	112	111	135	104	103	116
209		S	B	O	O	9	159	158	157	155	156	141	136	160	161	
210		-S	B	O	O	9	145	144	143	146	142	140	139	165	164	
211		A	O	-15	O	6	49		50	52	51		78		81	
212		S	B	-15	O	6	217		218	220	219		184		181	
213		-S	B	-15	O	6	232		231	229	230		185		180	
214		A	O	-20	O	6	56		55	53	54		79		80	
215		S	B	-20	O	6	224		223	221	222		183		182	
216		-S	B	-20	O	6	225		226	228	227		186		179	
217		A	O	O	O	9	39	40	41	43	42	48	30	26	25	
218	↓	O	B	O	O	6	47		46	44	45		29		28	

1	7	13	19	25	31	37	43	49	55	61	67	75	76		
CH R													0.1		
COEFFICIENTS													IDVAR (1)	IDVAR (2)	NDV
α OR β $S, A = -10$ TO $10^\circ, \Delta \alpha = 2^\circ$ SCHEDULES $B, B = -10$ TO $10^\circ, \Delta B = 2^\circ$															

MSFC - Form 263-2 (Rev. May 1973)

* Data UNRECORDED.

TABLE II. (Continued)

TEST : <u>MSFC TWT 594 (IA 33)</u>										DATA SET/RUN NUMBER COLLATION SUMMARY										DATE :		
DATA SET IDENTIFIER	CONFIGURATION	SCHD.		PARAMETERS/VALUES				NO. OF RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE)													
		α	β	S_r	S_e				0.6	0.8	0.9	1.10	1.25	1.46	1.96	2.99	4.96					
* R1C 219	<u>T₁ P₁ S₁ P₂ ϕ_1</u>	A	0	0	0			8	244	243	242	245	241	262	260		264					
* 220	↓	0	B					6	257		256	254	255		259		265					
221	<u>T₂ P₁ S₃ P₂ ϕ_1 F₂</u>	A	0					9	96	95	94	93	97	101	87	98	99					
222	↓	0	B					6	91		90	92	89		88		100					
223	<u>T₁ P₁ ϕ_1</u>	5	B					6	151		152	154	153		137		162					
224	↓	-5	B					6	150		149	147	148		138		163					
225	<u>T₁ P₁ S₂ P₂ ϕ_1</u>	A	0					9	57	58	59	61	60	110	77	83	82					
226	↓	0	B		✓			6	65		64	62	63		76		102					
* 227	<u>T₁ P₁ S₁ P₂ ϕ_1</u>	A	0		-5																	
* 228		0	B		-5																	
229		A	0		10			5	248		247	246	249		261							
230		0	B		10			5	252		251	253	250		258							
* 231		A	0		15																	
* 232		0	B	✓	15																	
233		0	B	-15	0			6	66		67	69	68		75		177					
234	↓	0	B	-20				6	73		72	70	71		74		178					
235	<u>T₁ P₁ S₃ P₂ ϕ_1 F₂</u>	A	0	0				2								86	85					
✓ 236	↓	0	B	0	✓			1									84					
		1	7	13	19	25	31	37	43	49	55	61	67	75	78							
										COEFFICIENTS										IDVAR (1)	IDVAR (2)	NDV
α OR β																						
SCHEDULES																						

TABLE II. (Continued)

[illegible]

TABLE II. (Continued)

TEST: <u>MSFC TWT 594 (IA33)</u>		DATA SET RUN NUMBER COLLATION SUMMARY						DATE: _____												
DATA SET IDENTIFIER	CONFIGURATION	SCHD.		PARAMETERS/VALUES				NO. OF RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE)											
		α	β	S_r	S_e				0.6	0.8	0.9	1.10	1.25	1.46	1.76	2.99	4.96	10.5		
<u>R1C 301</u>	<u>T, P</u>	A	O	-	-			7	1		2	3	4		18	237	23			
302	↓	O	B	-	-			7	16		15	13	14		17	240	24			
303	<u>T, P, S, P₂</u>	O	B	-	-			7	9		10	11	12		20	239	21			
304	↓	A	O	-	-			7	8		7	6	5		19	238	22			
305	<u>T, P, ϕ_1</u>	A	O	C	O			7	122		123	125	124		133	167	106			
306	↓	O	B	O	O			7	121		120	118	119		134	166	105			
307	<u>T, P, S, P₂, ϕ_1</u>	A	O	O	O			10	130	129	128	126	127	109	132	108	107	131		
308		O	B	O	O			10	115	114	113	117	112	111	135	104	103	116		
309		S	B	O	O			9	159	158	157	155	156	141	136	160	161			
310		-S	B	O	O			9	145	144	143	146	142	140	139	165	164			
311		A	O	-15	O			6	49		50	52	51		78		81			
312		S	B	-15	O			6	217		218	220	219		184		181			
313		-S	B	-15	O			6	232		231	229	230		185		180			
314		A	O	-20	O			6	56		55	53	54		79		80			
315		S	B	-20	O			6	224		223	221	222		183		182			
316		-S	B	-20	O			6	225		226	228	227		186		179			
* 317		A	O	O	O			9	39	40	41	43	42	48	30	26	25			
* V 318	V	O	B	O	O			6	47		46	44	45		29		28			
		1	7	13	19	25	31	37	43	49	55	61	67	75	76					
CHEO, CHEI																		0.2		
		COEFFICIENTS																IDVAR (1)	IDVAR (2)	NDV
α OR β ϕ <u>A = -10 To 10°; $\Delta\phi = 2^\circ$</u> SCHEDULES <u>P B = -10 To 10°; $\Delta B = 2^\circ$</u>																				

TABLE II. (Continued)

TEST: <u>MSFC TNT 594 (IA33)</u>										DATA SET/RUN NUMBER COLLATION SUMMARY										DATE: _____	
DATA SET IDENTIFIER	CONFIGURATION	SCHD.		PARAMETERS/VALUES				NO. OF RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE)												
		α	β	S_r	S_e				0.6	0.8	0.9	1.10	1.25	1.46	1.96	2.99	4.96				
<u>P2C 319</u>	<u>T₁ P₁ S₁ P₂ ϕ_1</u>	A	0	0	0			8	244	243	242	245	241	262	260		264				
320	↓	0	B					6	257		256	254	255		259		265				
321	<u>T₂ P₁ S₃ P₂ ϕ_1 F₂</u>	A	0					9	96	95	94	93	97	101	87	98	99				
322	↓	0	B					6	91		90	92	89		88		100				
323	<u>T₁ P₁ ϕ_1</u>	S	B					6	151		152	154	153		137		162				
324	↓	-S	B					6	150		149	147	148		138		163				
325	<u>T₁ P₁ S₂ P₂ ϕ_1</u>	A	0					9	57	58	59	61	60	110	77	83	82				
326	↓	0	B		✓			6	65		64	62	63		76		102				
* 327	<u>T₁ P₁ S₁ P₂ ϕ_1</u>	A	0		-5																
* 328		0	B		-5																
329		A	0		10			5	248		247	246	249		261						
330		0	B		10			5	252		251	253	250		258						
* 331		A	0		15																
* 332		0	B	✓	15																
333		0	B	-15	0			6	66		67	69	68		75		177				
334	↓	0	B	-20				6	73		72	70	71		74		178				
335	<u>T₁ P₁ S₃ P₂ ϕ_1 F₂</u>	A	0	0				2								86	85				
✓ 336	↓	0	B	0	✓			1									84				

TABLE II. (Continued)

[illegible]

TABLE II. (Continued)

TEST: <u>MSFC TWT 594 (IA33)</u>		DATA SET/RUN NUMBER COLLATION SUMMARY										DATE: _____						
DATA SET IDENTIFIER	CONFIGURATION	SCHD.		PARAMETERS/VALUES			NO. OF RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE)										
		α	β	δ_r	δ_e			0.6	0.8	0.9	1.10	1.25	1.46	1.96	2.99	4.96	1.05	
<u>R2C 401</u>	<u>T, P₁</u>	A	0	-	-		7	1		2	3	4		18	237	23		
402	↓	0	B	-	-		7	16		15	13	14		17	240	24		
403	<u>T, P₁, S, P₂</u>	0	B	-	-		7	9		10	11	12		20	239	21		
404	↓	A	0	-	-		7	8		7	6	5		19	238	22		
405	<u>T, P₁, ϕ_1</u>	A	0	0	0		7	122		123	125	124		133	167	106		
406	↓	0	B	0	0		7	121		120	118	119		134	166	105		
407	<u>T, P₁, S, P₂, ϕ_1</u>	A	0	0	0		10	130	129	128	126	127	109	132	108	107	131	
408		0	B	0	0		10	115	114	113	117	112	111	135	104	103	116	
409		S	B	0	0		9	159	158	157	155	156	141	136	160	161		
410		-5	B	0	0		9	145	144	143	146	142	140	139	165	164		
411		A	0	-15	0		6	49		50	52	51		78		81		
412		S	B	-15	0		6	217		218	220	219		184		181		
413		-5	B	-15	0		6	232		231	229	230		185		180		
414		A	0	-20	0		6	56		55	53	54		79		80		
415		S	B	-20	0		6	224		223	221	222		183		182		
416		-5	B	-20	0		6	225		226	228	227		186		179		
417		A	0	0	0		9	39	40	41	43	42	48	30	26	25		
V 418	↓	0	B	0	0		6	47		46	44	45		29		28		
		7	13	19	25	31	37	43	49	55	61	67	75	76				
CHBF																		0.1
		COEFFICIENTS										IDVAR (1)		IDVAR (2)		NDV		
α OR β α		<u>A: -10 to 10°; $\Delta\alpha = 2^\circ$</u>																
SCHEDULES β		<u>B: -10 to 10°; $\Delta\beta = 2^\circ$</u>																

MSFC - Form 263-2 (Rev. May 1973)

* DATA UNRECORDED

TABLE II. (Continued)

TEST: MSFC TW T 594 (I A 33)		DATA SET / RUN NUMBER COLLATION SUMMARY										DATE:						
DATA SET IDENTIFIER	CONFIGURATION	SCHD.		PARAMETERS/VALUES				NO. OF RUNS	MACH NUMBERS (OR ALTERNATE INDEPENDENT VARIABLE)									
		α	β	S_r	S_e				0.6	0.8	0.9	1.10	1.25	1.46	1.76	2.99	4.96	
* 419	$T_1 P_1 S_1 P_2 \phi_1$	A	0	0	0			8	244	243	242	245	241	262	260		264	
* 420	\downarrow	0	B					6	257		256	254	255		259		265	
421	$T_2 P_1 S_3 P_2 \phi_1 F_2$	A	0					9	96	95	94	93	97	101	87	98	99	
422	\downarrow	0	B					6	91		90	92	89		88		100	
423	$T_1 P_1 \phi_1$	5	B					6	151		152	154	153		137		162	
424	\downarrow	-5	B					6	150		149	147	148		138		163	
425	$T_1 P_1 S_2 P_2 \phi_1$	A	0					9	57	58	59	61	60	110	77	83	82	
426	\downarrow	0	B		\checkmark			6	65		64	62	63		76		102	
* 427	$T_1 P_1 S_1 P_2 \phi_1$	A	0		-5													
* 428		0	B		-5													
429		A	0		10			5	248		247	246	249		261			
430		0	B		10			5	252		251	253	250		258			
* 431		A	0		15													
* 432		0	B	\checkmark	15													
433		0	B	-15	0			6	66		67	69	68		75		177	
434	\downarrow	0	B	-20				6	73		72	70	71		74		178	
435	$T_1 P_1 S_3 P_2 \phi_1 F_2$	A	0	0				2								86	85	
\checkmark 436	\downarrow	0	B	0	\checkmark			1									84	

TEST RUN NUMBERS

42

1 7 13 19 25 31 37 43 49 55 61 67 75 76

COEFFICIENTS
IDVAR (1) IDVAR (2) NDV

α OR β
SCHEDULES

TABLE II. (Continued)

[illegible]

77422

TEST RUN NUMBERS

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44

1995

TABLE III.
MODEL DIMENSIONAL DATA

MODEL COMPONENT : BODY - B62

GENERAL DESCRIPTION : Configuration 140 C, orbiter fuselage, MCR
200-R1, Similar to 140 A/B fuselage except aft body revised and
improved midbody-wing-boom fairing, $X_0 = 940$ to $X_0 = 1040$.

MODEL SCALE: 0.0014

DRAWING NUMBER : VL70-000140C, -000202C, 000205A, -000200B, -000203A.

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length (IML: Fwd Sta. $X_0=238$), In.	<u>1290.3</u>	<u>5.161</u>
Length (OML: Fwd Sta $X_0=235$), In.	<u>1293.3</u>	<u>5.173</u>
Max Width(@ $X_0 = 1528.3$), In.	<u>264.0</u>	<u>1.056</u>
Max Depth (@ $X_0 = 1464$), In.	<u>250.0</u>	<u>1.000</u>
Fineness Ratio	<u>4.899</u>	<u>4.899</u>
Area - Ft ²	<u> </u>	<u> </u>
Max. Cross-Sectional	<u>310.885</u>	<u>0.0055</u>
Planform	<u> </u>	<u> </u>
Wetted	<u> </u>	<u> </u>
Base	<u> </u>	<u> </u>

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TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT : CANOPY - C₁₂

GENERAL DESCRIPTION : Configuration 140 C, orbiter canopy, vehicle
cabin No. 31 updated to MCR 200-R₁. Used with fuselage B₆₂.

MODEL SCALE: 0.004

DRAWING NUMBER : VL70-000140C, -000202B, -000204

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length ($X_0 = 434.643-578$), in.	<u>143.357</u>	<u>0.573</u>
Max Width (@ $X_0 = 513.127$), in.	<u>152.412</u>	<u>0.610</u>
Max Depth ($Z_0 = 501$ to 449.39), in.	<u>51.61</u>	<u>0.206</u>
Fineness Ratio	<u> </u>	<u> </u>
Area	<u> </u>	<u> </u>
Max. Cross-Sectional	<u> </u>	<u> </u>
Planform	<u> </u>	<u> </u>
Wetted	<u> </u>	<u> </u>
Base	<u> </u>	<u> </u>

TABLE III. MODEL DIMENSIONAL DATA (Continued)

*REVISED 4/24/74

MODEL COMPONENT: ELEVON - F₂₆GENERAL DESCRIPTION: Configuration 140A/B Orbiter elevonsData are for one side.MODEL SCALE: 0.0040 MODEL DRAWING: SS-A00148, RELEASE 6DRAWING NUMBER: VL70-000200, -006089, -006092

<u>DIMENSIONS:</u>	<u>FULL-SCALE</u>	<u>MODEL SCALE</u>
Area - Ft ²	<u>210.0</u>	<u>0.003</u>
Span (equivalent), In.	<u>349.2</u>	<u>1.397</u>
Inb'd equivalent chord, In.	<u>118.004</u>	<u>0.472</u>
Outb'd equivalent chord, In.	<u>55.192</u>	<u>0.221</u>
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord	<u>0.2096</u>	<u>0.2096</u>
At Outb'd equiv. chord	<u>0.4004</u>	<u>0.4004</u>
Sweep Back Angles, degrees		
Leading Edge	<u>0.00</u>	<u>0.00</u>
Trailing edge	<u>-10.056</u>	<u>-10.056</u>
Hingeline	<u>0.00</u>	<u>0.00</u>
*Area Moment (Product of area & \bar{c}), Ft ³	<u>1587.25</u>	<u>0.0001</u>
*Mean Aerodynamic Chord, In.	<u>90.7</u>	<u>0.363</u>

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT : BODY FLAP - F₁₀

GENERAL DESCRIPTION : Configuration 140C, body flap, Hingeline
located at X₀ = 1532, Z₀ = 238.

MODEL SCALE: 0.0040

DRAWING NUMBER : VL70-000140C, VL70-355114

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length (X ₀ =1525.5 to X ₀ =1613), In.	<u>87.50</u>	<u>0.350</u>
Max Width (@ L.E., X ₀ = 1525.5), In.	<u>256.00</u>	<u>1.024</u>
Max Depth (X ₀ = 1532), In.	<u>19.798</u>	<u>0.0792</u>
Fineness Ratio	<u> </u>	<u> </u>
Area - Ft ²	<u> </u>	<u> </u>
Max. Cross-Sectional (@H.L.)	<u>35.196</u>	<u>0.00056</u>
Planform	<u>135.00</u>	<u>0.0022</u>
Wetted	<u> </u>	<u> </u>
Base (X ₀ = 1613)	<u>4.89</u>	<u>0.000078</u>

TABLE III. MODEL DIMENSIONAL DATA (Continued)

MODEL COMPONENT: WING-W 127GENERAL DESCRIPTION: Configuration 140C orbiter wing, MCR 200-B₁, similar to 140A/B wing W₁₁₆ but with refinements: improved wing-body fairing ($X_0 = 940$ to $X_0 = 1040$); elevon split line relocated from $Y_0 = 281$ to $Y_0 =$ MODEL SCALE: 0.0040

TEST NO.

DWG. NO. VL70-000140C, -000200B

DIMENSIONS:

FULL-SCALE

MODEL SCALE

TOTAL DATA

Area (Theo.) Ft^2
 Planform
 Span (Theo) In.
 Aspect Ratio
 Rate of Taper
 Taper Ratio
 Dihedral Angle, degrees
 Incidence Angle, degrees
 Aerodynamic Twist, degrees
 Sweep Back Angles, degrees

Leading Edge
 Trailing Edge
 0.25 Element Line

Chords:

Root (Theo) B.P.O.O.
 Tip, (Theo) B.P.
 MAC
 Fus. Sta. of .25 MAC
 W.P. of .25 MAC
 B.L. of .25 MAC

EXPOSED DATA

Area (Theo) Ft^2
 Span, (Theo) In. BP108
 Aspect Ratio
 Taper Ratio
 Chords

Root BP108
 Tip $1.00 \frac{b}{2}$
 MAC
 Fus. Sta. of .25 MAC
 W.P. of .25 MAC
 B.L. of .25 MAC

Airfoil Section (Rockwell Mod NASA)
 XXXX-64

Root $\frac{b}{2} =$

Tip $\frac{b}{2} =$

Data for (1) of (2) Sides

Leading Edge Cuff Ft^2
 Planform Area Ft^2
 Leading Edge Intersects Fus M. L. @ Sta
 Leading Edge Intersects Wing @ Sta

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT : OMS POD - M₁

GENERAL DESCRIPTION : Preliminary IML version of short OMS pod.

(First used on 0.015 scale Model 36-0 for test No. OA83).

MODEL SCALE: 0.0040

DRAWING NUMBER: VL70-008457

DIMENSIONS : (For 1 of 2 sides).	FULL SCALE	MODEL SCALE
Length (OMS Fwd Sta $X_0=1311$), In.	<u>254.00</u>	<u>1.016</u>
Max Width (@ $X_0 = 1511$), In.	<u>135.6</u>	<u>0.5424</u>
Max Depth (@ $X = 1511$), In.	<u>73.6</u>	<u>0.2944</u>
Fineness Ratio	<u>2.54080</u>	<u>2.54080</u>
Area - Ft ²	<u> </u>	<u> </u>
Max. Cross-Sectional	<u>54.507</u>	<u>0.00287</u>
Planform	<u> </u>	<u> </u>
Wetted	<u> </u>	<u> </u>
Base	<u> </u>	<u> </u>

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: OMS NOZZLES - N₂₈

GENERAL DESCRIPTION: Configuration 140A/B Orbiter OMS nozzles

MODEL SCALE: 0.0040

DRAWING NUMBER: VL70-000140A (Location): SS-A00106, RELEASE 5 (Contour)

DIMENSIONS:	<u>FULL SCALE</u>	<u>MODEL SCALE</u>
MACH NO.		
Length - In.		
Gimbal Point to Exit Plane		
Throat to Exit Plane		
Diameter - In.		
Exit		
Throat		
Inlet		
Area - ft ²		
Exit		
Throat		
Gimbal Point (Station) - In.		
Upper Nozzles Left Nozzle		
X	<u>1518.0</u>	<u>6.072</u>
Y	<u>- 68.0</u>	<u>- 0.352</u>
Z	<u>492.0</u>	<u>1.968</u>
Right		
Lower Nozzles		
X	<u>1518.00</u>	<u>6.072</u>
Y	<u>88.0</u>	<u>0.352</u>
Z	<u>492.0</u>	<u>1.968</u>
Null Position - Deg.		
Left Upper Nozzle		
Pitch	<u>15° 49'</u>	<u>15° 49'</u>
Yaw	<u>12° 17'</u>	<u>12° 17'</u>
Right		
Lower Nozzle		
Pitch	<u>15° 49'</u>	<u>15° 49'</u>
Yaw	<u>12° 17'</u>	<u>12° 17'</u>

*REVISED 4/24/74

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: VERTICAL - V₈

GENERAL DESCRIPTION: Configuration 140C, orbiter vertical tail

(identical to configuration 140A/B vertical tail)

MODEL SCALE: 0.0040

DRAWING NUMBER: VL70-000140C, -000146B

DIMENSIONS:

FULL SCALE

MODEL SCALE

TOTAL DATA

Area (Theo) - Ft²

Planform

413.253

0.0065

Span (Theo) - In.

315.720

1.263

Aspect Ratio

1.675

1.675

Rate of Taper

0.507

0.507

Taper Ratio

0.404

0.404

Sweep-Back Angles, Degrees.

Leading Edge

45.000

45.000

* Trailing Edge

26.2

26.2

0.25 Element Line

41.130

41.130

Chords:

Root (Theo) WP

268.500

1.074

Tip (Theo) WP

108.470

0.434

MAC

199.808

0.799

Fus. Sta. of .25 MAC

1463.50

5.854

W.P. of .25 MAC

635.522

2.542

B.L. of .25 MAC

0.000

0.000

Airfoil Section

Leading Wedge Angle - Deg.

10.000

10.000

Trailing Wedge Angle - Deg.

14.920

14.920

Leading Edge Radius

2.00

0.008

Void Area

13.17

0.00021

Blanketed Area

0.00

0.000

TABLE III. MODEL DIMENSIONAL DATA (Continued)

MODEL COMPONENT: RUDDER - R₅

GENERAL DESCRIPTION: Configuration 140C orbiter rudder (identical to configuration 140A/B rudder).

MODEL SCALE: 0.0040

DRAWING NUMBER: VL70-000146B, -000095

<u>DIMENSIONS:</u>	<u>FULL-SCALE</u>	<u>MODEL SCALE</u>
Area - Ft ²	<u>100.15</u>	<u>0.0016</u>
Span (equivalent) , In.	<u>201.00</u>	<u>0.804</u>
Inb'd equivalent chord , In.	<u>91.585</u>	<u>0.366</u>
Outb'd equivalent chord , In.	<u>50.833</u>	<u>0.203</u>
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord	<u>0.400</u>	<u>0.400</u>
At Outb'd equiv. chord	<u>0.400</u>	<u>0.400</u>
Sweep Back Angles, degrees		
Leading Edge	<u>34.83</u>	<u>34.83</u>
Trailing Edge	<u>26.25</u>	<u>26.25</u>
Hingeline	<u>34.83</u>	<u>34.83</u>
Area Moment (Product of Area and \bar{c}), Ft ³	<u>610.92</u>	<u>0.000039</u>
Mean Aerodynamic Chord	<u>73.2</u>	<u>0.293</u>

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: ATTACH STRUCTURE - AT16

GENERAL DESCRIPTION: Forward orbiter/ET attach structure (2 member structure)

MODEL SCALE: 0.0040

MODEL DRAWING: SS-A00117

DRAWING NO.: VL78-000062B, SK-H-4011

DIMENSIONS:	MEMBER		FULL SCALE	MODEL SCALE
	#1	X _O	394.38	1.578
		Y _O	0.00	0.00
		Z _O	LWR ML	LWR ML
		X _T	1131.00	4.524
		Y _T	561.298	0.187
		Z _T	561.298	2.245
	#2	X _O	394.38	1.578
		Y _O	0	0
		Z _O	LWR ML	LWR ML
		X _T	1131.00	4.524
		Y _T	- 46.8	- 0.187
		Z _T	561.298	2.245
Diameter of members: (In.)			5.70	0.0228

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: ATTACH STRUCTURE - AT₂₅

GENERAL DESCRIPTION: Strengthened attach structure, left rear orbiter to ET -
2 members.

MODEL SCALE: 0.0040

DRAWING NO.: VL78-000062B, VL78-000063

DIMENSIONS:		<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Member No. 1 (Aft):	X _O	1317.00	5.268
	Y _O	- 96.50	- 0.386
	Z _O	267.50	1.070
	X _T	2058.00	8.232
	Y _T	- 96.50	- 0.386
	Z _T	515.50	2.062
	Diameter, In.	11.50	0.046
Member No. 2 (Forward):	X _O	1317.00	5.268
	Y _O	- 96.50	- 0.386
	Z _O	267.50	1.070
	X _T	1872.00	7.488
	Y _T	- 125.88	- 0.503
	Z _T	504.50	2.018
	Diameter, In.	15.50	0.062

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: ATTACH STRUCTURE - AT₂₆

GENERAL DESCRIPTION: Strengthening attach structure right rear Orbiter to ET -
2 members.

MODEL SCALE: 0.0040

DRAWING NO.: VL78-000062B, VL78-000063

DIMENSIONS:		<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Member No. 1 (Aft)	X _O	1317.00	5.268
	Y _O	96.50	0.386
	Z _O	267.50	1.070
	X _T	2058.00	8.232
	Y _T	96.50	0.386
	Z _T	515.50	2.062
	Diameter, In.	11.50	0.046
Member No. 2 (Forward)	X _O	1317.00	5.268
	Y _O	96.50	0.386
	Z _O	267.50	1.070
	X _T	1872.00	7.488
	Y _T	125.68	0.503
	Z _T	504.50	2.018
	Diameter, In.	15.50	0.062

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: ATTACH STRUCTURE - AT₂₄

GENERAL DESCRIPTION: Forward orbiter/ET attach structure (2 member structure)
simulating the attach structure after ET separation.

MODEL SCALE: 0.0040

MODEL DRAWING: SS-A00117

DIMENSIONS:		<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Member #1	X _O	346.00	1.384
	Y _O	0.00	0.00
	Z _O	280.07	1.120
	X _T	1131.00	4.524
	Y _T	46.00	0.184
	Z _T	565.07	2.260
Member #2	X _O	346.00	1.384
	Y _O	0.00	0.00
	Z _O	280.07	1.120
	X _T	1131.00	4.524
	Y _T	- 46.00	- 0.184
	Z _T	280.07	1.120
Diameter of Members, In.		5.70	0.0228

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: FEEDLINE - FL₅

GENERAL DESCRIPTION: LOX feedline simulated between ET and Orbiter.

MODEL SCALE: 0.0040

MODEL DRAWING: SS-A00117

DRAWING NO.: VL78-000062B

DIMENSIONS:

		<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Leading edge at:	X _T	1033.3	4.132
	Y _T	70.0	0.280
	X _T	1033.3	4.132
	Y _T	- 70.0	- 0.280
Trailing edge at:	X _T	2071.50	8.286
	Y _T	70.00	0.280
	X _T	2071.50	8.286
	Y _T	70.00	0.280
Diameter, In.		18.80	0.188

Centerline of LOX feedline located radially at $\phi = 23^{\circ}24'$

TABLE III. (Continued)

MODEL, DIMENSIONAL DATA

MODEL COMPONENT: PRESSURE LINE - FL₆GENERAL DESCRIPTION: Max. cross-sectional area simulating LH₂ pressure line and electrical conduit box between ET and Orbiter.

MODEL SCALE: 0.0040

DRAWING NO.: VL78-000062B

MODEL DRAWING: SS-A00117

DIMENSIONS:

		<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Leading edge at:	X _T	1127.1	4.508
	Y _T	110.3	0.441
Trailing edge at:	X _T	2062.1	8.248
	Y _T	110.3	0.441

Centerline of LH pressure line located radially at $\phi = 33^{\circ}45'$.

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT : LH₂ UMBILICAL FEEDLINE - ET₉

GENERAL DESCRIPTION : LH₂ Umbilical Feedline with an electrical quick-
disconnect box between the Orbiter and ET.

MODEL SCALE: 0.0040

DRAWING NUMBER : VL78-003062B

DIMENSIONS :	FULL SCALE	MODEL SCALE
Centerline at X	<u>2071.5</u>	<u>8.286</u>
Max Width	<u>31.2</u>	<u>0.125</u>
Max Depth	<u>37.5</u>	<u>0.150</u>
Diameter	<u>17.0</u>	<u>0.068</u>
Area	<u> </u>	<u> </u>
Max. Cross-Sectional	<u> </u>	<u> </u>
Planform	<u> </u>	<u> </u>
Wetted	<u> </u>	<u> </u>
Base	<u> </u>	<u> </u>

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: REAR ATTACH STRUCTURE FAIRING - FR₆

GENERAL DESCRIPTION: Rear ET/Orbiter attach structure cross-member or beam fairing used in conjunction with AT₁₂, AT₁₃, FL₁ and FL₂.

MODEL SCALE: 0.0040

DRAWING NO.: VL78-000062B

MODEL DRAWING: SS-A01256

DIMENSIONS:

		<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Leading edge centerline at	X _T	2036.67	8.147
	Y _T	0.00	0.00
	Z _T	183.00	0.732
Maximum length, In.		64.00	0.256
Maximum width, In.		190.00	0.760

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: ET PROTUBERANCE - PT₁₂

GENERAL DESCRIPTION: Lightning rod attached to ET nose.

MODEL SCALE: 0.004

DRAWING NO.: VL78-000068A

DIMENSIONS:	<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Length	30.90	0.124
Diameter, In.	3.20	0.013

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: ET PROTUBERANCE - PT₁₃

GENERAL DESCRIPTION: Maximum cross-sectional area simulating LOX recirculation line and electrical conduit box on planform view of External Tank, T₂₀.

MODEL SCALE: 0.0040

MODEL DRAWING: SS-A00117

DRAWING NO.: VL78-000062B

DIMENSIONS:

		<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Leading edge at:	X _T	1208.3	4.833
	Y _T	+ 95.0	+ 0.380
	X _T	1208.3	4.833
	Y _T	- 95.0	- 0.380
Trailing edge at:	X _T	2060.5	8.242
	Y _T	95.0	0.380
	X _T	2060.5	8.242
	Y _T	- 95.0	- 0.380

Centerline of LOX recirculation line located radially at $\phi = 33^{\circ}45'$.

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: ET PROTUBERANCE - PT₁₄

GENERAL DESCRIPTION: LOX pressure line on Tank T₂₀.

MODEL SCALE: 0.0040

DRAWING NO.: VL78-000062B

DIMENSIONS:		<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Leading edge at:	X _T	355.90	1.424
	Y _T	6.0	0.024
Trailing edge at:	X _T	2060.5	8.242
	Y _T	.87.0	0.348

Centerline of LOX pressure line located radially at $\phi = 23^{\circ}24'$.

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: NOSE CONE LINES - PT₂₀

GENERAL DESCRIPTION: Maximum cross-sectional area simulating the LOX pressure line and electrical conduit on top of external tank (T₂₀) nose cone area.

MODEL SCALE: 0.0040

DRAWING NO.:

DIMENSIONS:		<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Leading edge at:	X _T	360.92	1.444
	Y _T	34.0	0.136
Trailing edge at:	X _T	955.1	3.820
	Y _T	336.5	1.346

Centerline of lines located radially at $\phi = 33^{\circ}45'$.

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: Tank base extension - FT₂₁

GENERAL DESCRIPTION: Cylindrical base extension on external tank, T₂₀.

MODEL SCALE: 0.0040

DRAWING NO.: VL72-000131, VL78-000062

MODEL DRAWING: LMSC R80058

<u>DIMENSIONS:</u>	<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Length, In.	428.25	1.713
Diameter, In.	330.20	1.321
Area - Ft ²		
Max. Cross-sectional	594.679	2.379
Base	594.679	2.379
WP of Extension centerline	400.00	1.600

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT : EXTERNAL TANK - T₂₀

GENERAL DESCRIPTION : External Oxygen-Hydrogen tank

MODEL SCALE: 0.0040

DRAWING NUMBER : VI.72-000131, VI.78-000062

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length, In. (Nose @ $X_0=328.92$)	<u>1846.905</u>	<u>7.386</u>
Max Width Dia, In. @ $X_0=975.675$	<u>333.2</u>	<u>1.333</u>
Max Depth ; In.	<u>330.2</u>	<u>1.333</u>
Fineness Ratio	<u>5.65713</u>	<u>5.65713</u>
Area - Ft ²	<u> </u>	<u> </u>
Max. Cross-Sectional	<u>605.534</u>	<u>0.0096</u>
Major Cross section	<u>594.679</u>	<u>0.0095</u>
WF of tank centerline (Z), In.	<u>400.000</u>	<u>0.0064</u>
Base (on 330.2 dia.)	<u>594.679</u>	<u>0.0095</u>

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT : EXTERNAL TANK - T₂₇

GENERAL DESCRIPTION : External tank T₂₀ with 1208 In. radius drive

nose

MODEL SCALE: 0.0040

MODEL DRAWING: LMS C R80058

DRAWING NUMBER: VL72-000131, VL78-000062

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length , In. (@ $X_0=328.92$)	<u>1047.155</u>	<u>7.789</u>
Max. Dia, In. (@ $X_T = 975.675$)	<u>333.2</u>	<u>1.333</u>
Major Diameter, In.	<u>330.2</u>	<u>1.333</u>
Fineness Ratio	<u>5.897</u>	<u>5.897</u>
Area - Ft ² (@ $X_T 975.675$)		
Max. Cross-Sectional	<u>605.534</u>	<u>0.0097</u>
Major Cross-section Planform	<u>594.679</u>	<u>0.0095</u>
Wetted		
Base (on 330.2 dia.)	<u>594.679</u>	<u>0.0095</u>
WP of tank centerline (Z)	<u>400.00</u>	<u>0.0064</u>

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: SRB PROTUBERANCE - PS₇

GENERAL DESCRIPTION: SRB/ET attach ring: two attach rings and one structural ring.

MODEL SCALE: 0.0040

DRAWING NO.: VL77-000066

DIMENSIONS (DATA FOR 1 OF 2):

	<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Centerline at X _B	1505	6.020
	1517	6.068
	1852	7.408
Width	10	0.040
Height	10	0.040

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: ELECTRICAL TUNNEL - PS₈

GENERAL DESCRIPTION: Electrical tunnel on wall of solid rocket motor
booster.

MODEL SCALE: 0.0040

DRAWING NO.: VL77-000036A

DIMENSIONS:	<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Length, In.	1341.5	5.366
Width ; In.	6.0	0.024
Height, In.	3.0	0.012
Leading edge angle (Deg.)	18	18

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: Tie-DOWN STRUCTURE - PS-9

GENERAL DESCRIPTION: Tie-down lugs on shroud of solid rocket motor booster.

MODEL SCALE: 0.004

DRAWING NO.: VL77-000066

DIMENSIONS:

	<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Number of tie-down lugs	4	4
Length, In.	64.00	0.256
Width, In.	13.00	0.052
Max. Height (at T. E.)	8.334	0.033
Angular position (from vertical), Deg.	60	60

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: BOOSTER, SOLID ROCKET MOTOR - S₁₄

GENERAL DESCRIPTION: SRB with 20° aft skirt

MODEL SCALE: 0.004

MODEL DRAWING: LMSC R80055, R80056

DRAWING NO.: VL77-000066

DIMENSIONS:	<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Length (includes nozzle), In.	1789.40	7.153
Tank diameter, In.	146.00	0.584
Aft skirt diameter, In.	213.70	0.855
Skirt flare angle	20°	20°
Fineness ratio:	12.256	12.256
Area - Ft ²		
Max. Cross-sectional (tank)	116.261	0.0019
Max. cross sectional (skirt)	249.079	0.0040
WL of BSRM centerline (Z _T)	400.00	2.600
FS of BSRM nose (X _T)	743.00	2.972
BP of BSRM centerline (Y _T)	250.5	1.002

TABLE III. (Continued)
MODEL DIMENSIONAL DATA

MODEL COMPONENT: BOOSTER, SOLID ROCKET MOTOR - S₁₅

GENERAL DESCRIPTION: SRB with 28° nose

MODEL SCALE: 0.004

MODEL DRAWING: LMSC R80055, R80056

DRAWING NO.: VL77-000066

DIMENSIONS:

	<u>FULL SCALE</u>	<u>MODEL SCALE</u>
Length (includes nozzle), In.	1846.40	7.386
Tank diameter, In.	146.00	0.584
Aft skirt diameter, in.	192.00	0.768
Nose planform angle	28°	28°
Nose side view angle	14°	14°
Fineness ratio	12.647	12.647
Area - Ft ²		
Max. cross-sectional (tank)	116.261	0.0064
Max. cross-sectional (skirt)	201.062	0.0032
WL of BSRM centerline (Z _T)	400.00	1.600
FS of BSRM nose (X _T)	743.00	2.972
BP of BSRM centerline (Y _T)	250.5	1.002

TABLE III. (Concluded)
MODEL DIMENSIONAL DATA

MODEL COMPONENT : BOOSTER SOLID ROCKET MOTOR - S₁₉
 GENERAL DESCRIPTION : Configuration MCR 500. Data for 1 of 2 sides.

 MODEL SCALE: 0.0040

 DRAWING NUMBER VL77-000066

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length (Includes nozzle), In.	<u>1989.4</u>	<u>7.958</u>
Max Width (Tank dia.), In.	<u>146.0</u>	<u>0.584</u>
Max Depth (Aft shroud), In.	<u>192.0</u>	<u>0.768</u>
Fineness Ratio	<u>9.06771</u>	<u>9.06771</u>
Area - Ft ²	<u> </u>	<u> </u>
Max. Cross-Sectional	<u>201.06193</u>	<u>0.0032</u>
Planform	<u> </u>	<u> </u>
Wetted	<u> </u>	<u> </u>
Base	<u> </u>	<u> </u>
WP of BSRM centerline (Z _T), In.	<u>400.00</u>	<u>1.600</u>
FS of BSRM Nose (X _T), In.	<u>743.00</u>	<u>2.972</u>

Notes:

1. Positive directions of force coefficients, moment coefficients, and angles are indicated by arrows
2. For clarity, origins of wind and stability axes have been displaced from the center of gravity

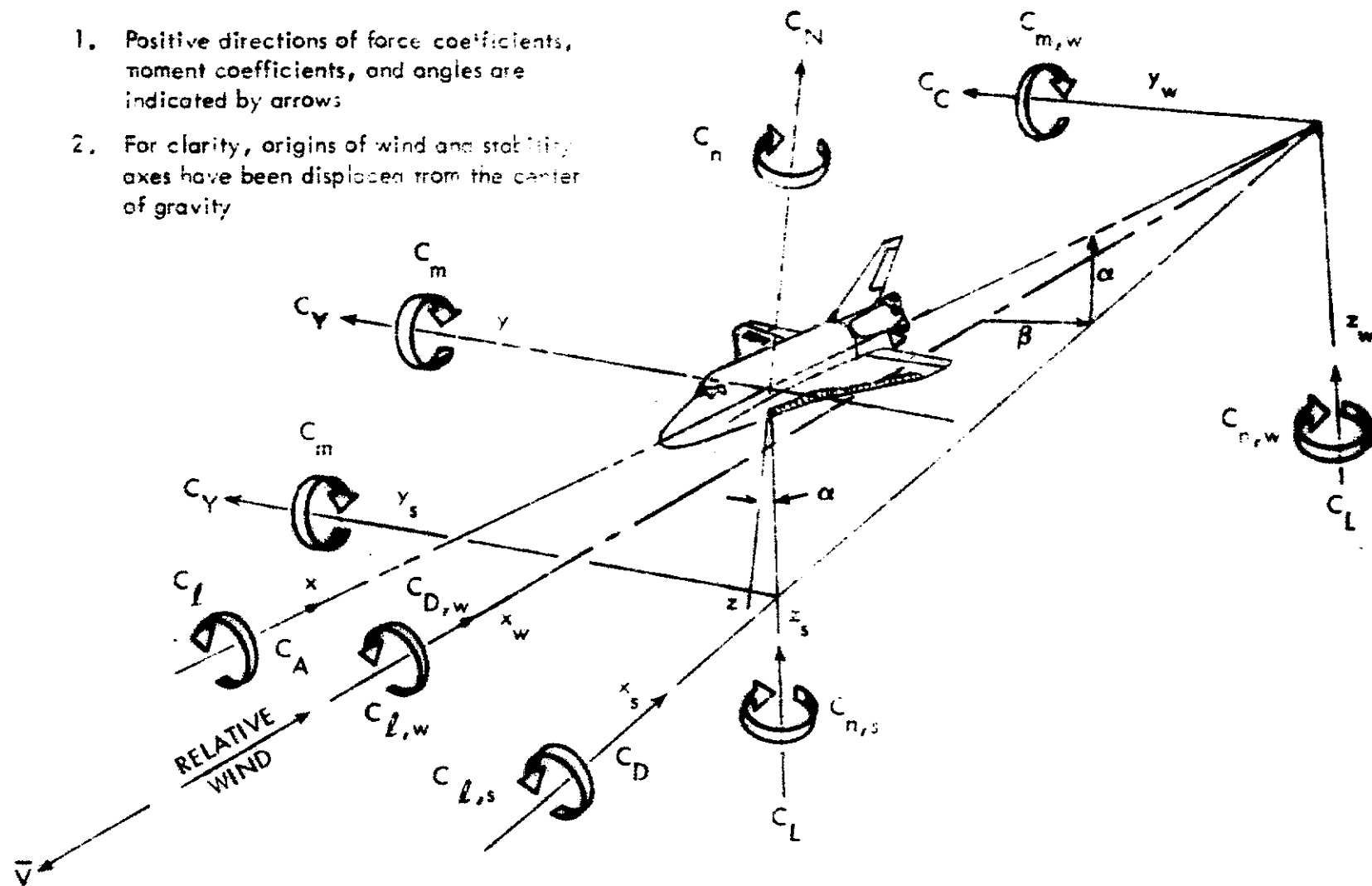
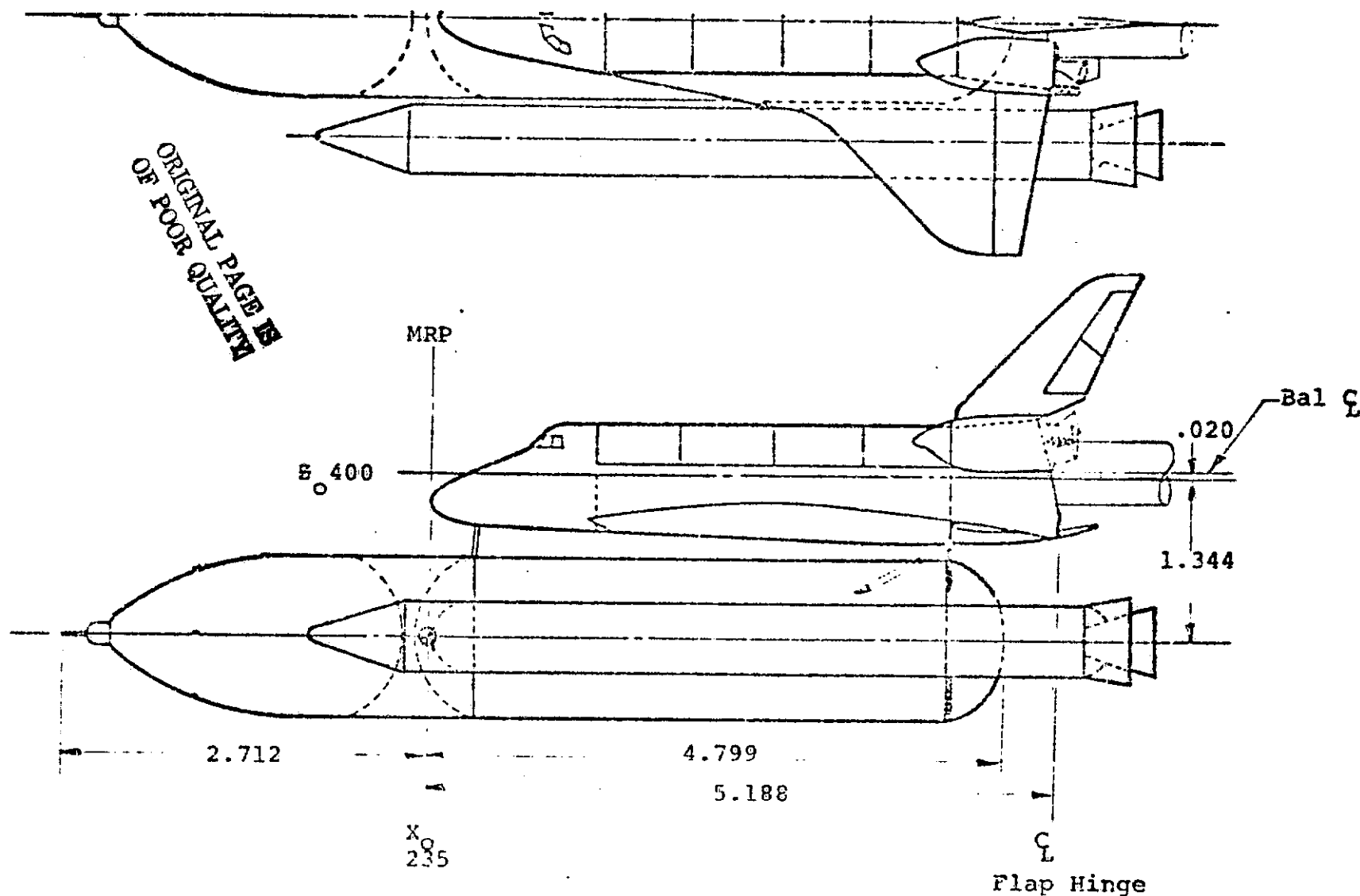


Figure 1. Axis Systems

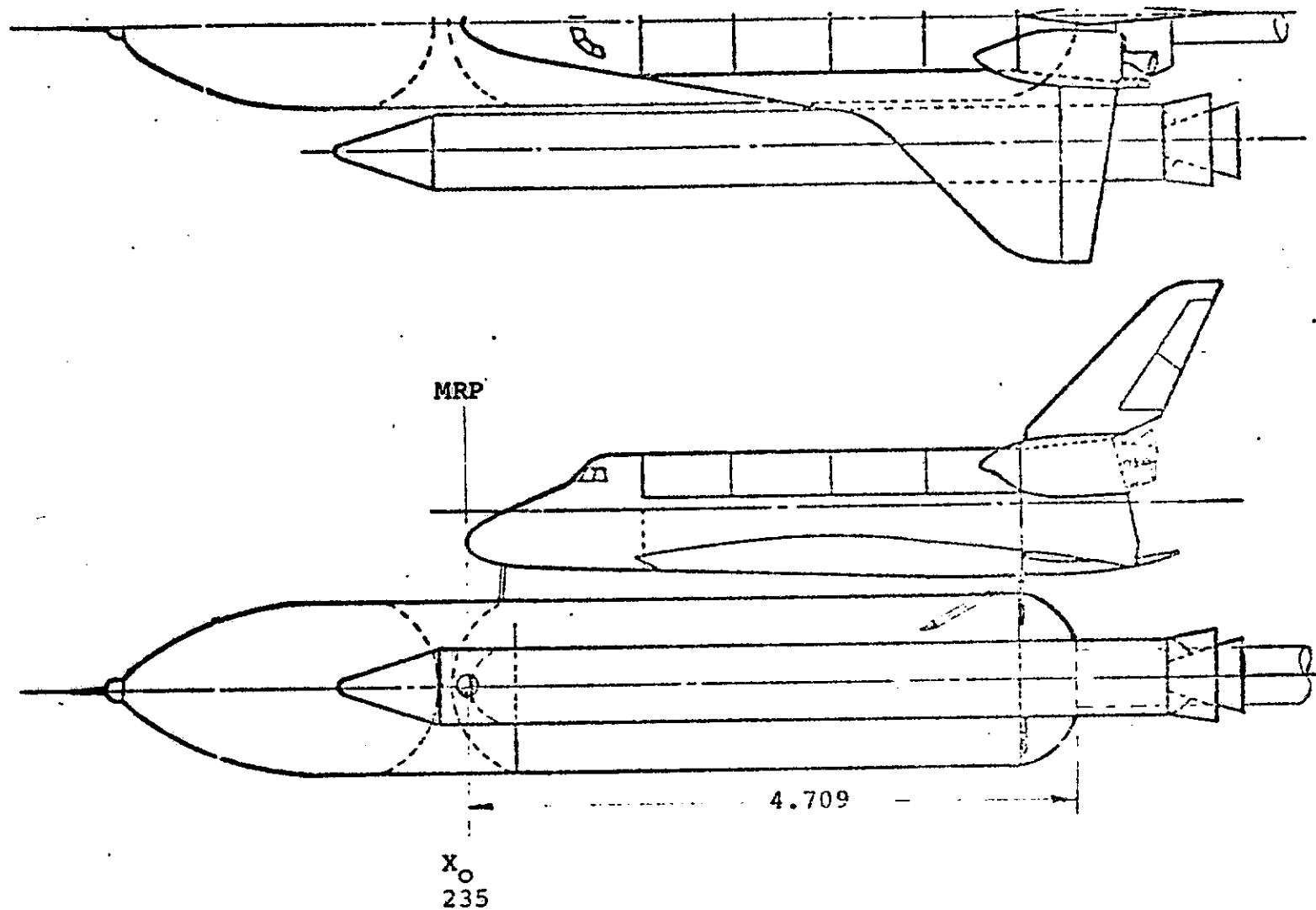
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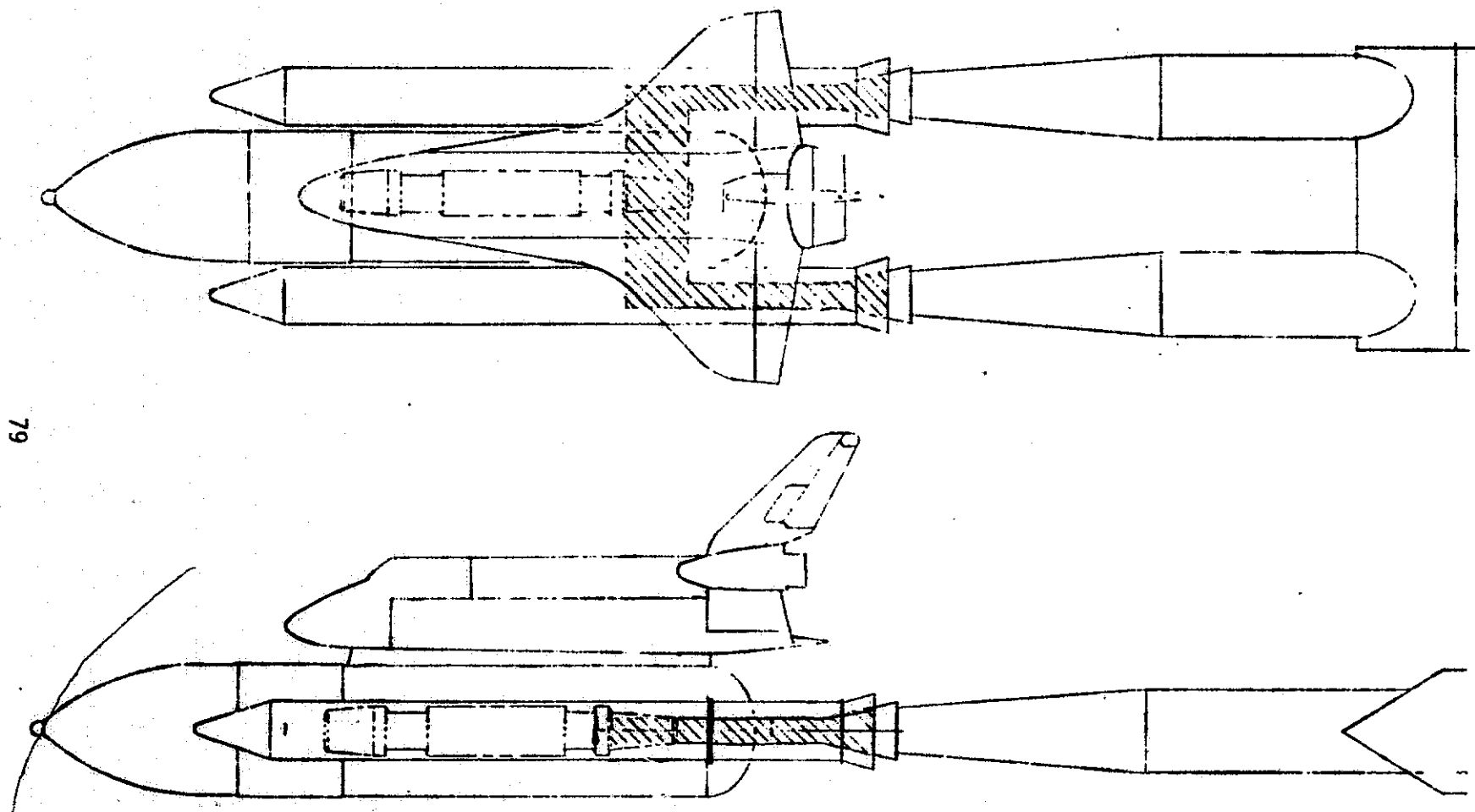


a. General Arrangement of Launch Vehicle Model
(Balance In Orbiter)

Figure 2. - Model Sketches and Graphs.

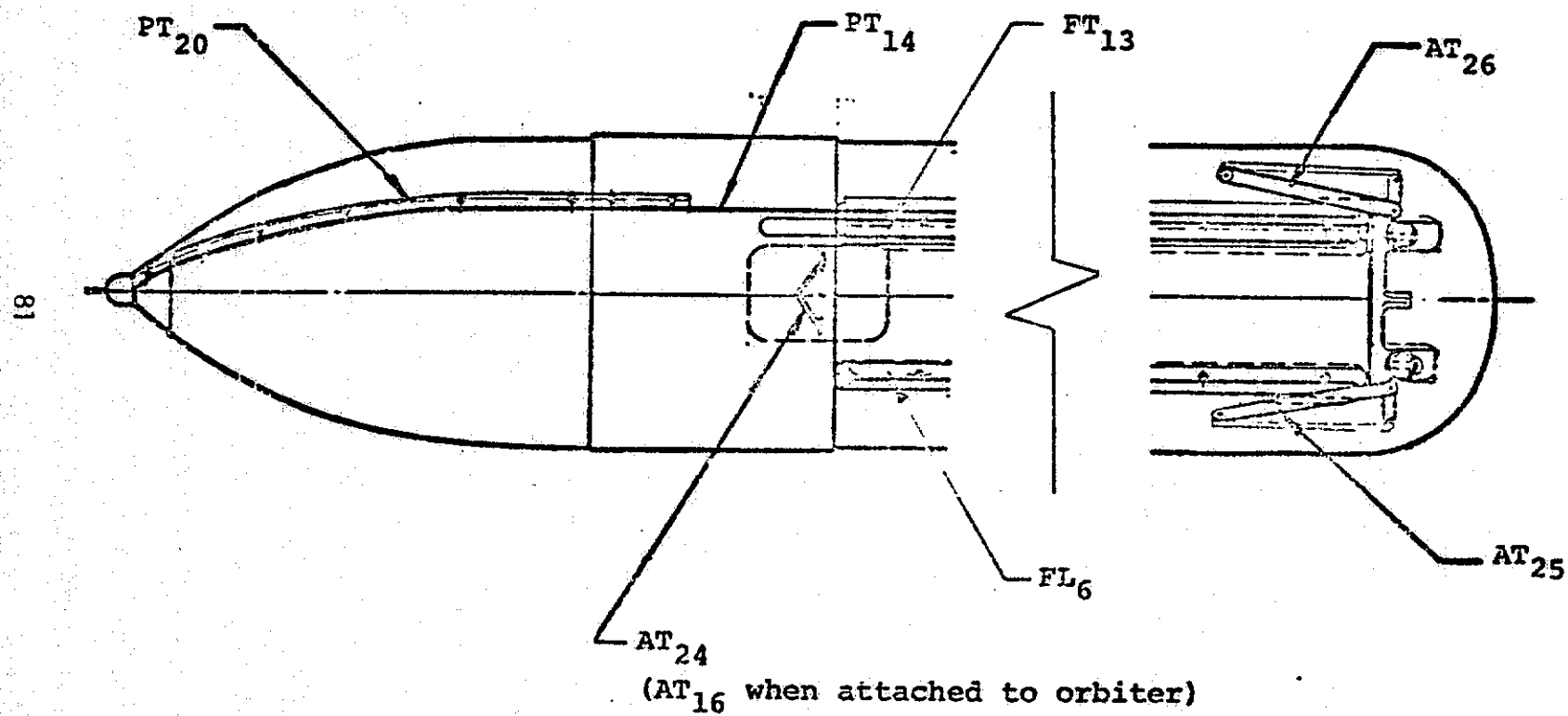


b. General Arrangement of Launch Vehicle Model
(Balance in Tank, Straight Sting)
Figure 2. - Continued.



c. General Arrangement of Launch Vehicle Model
 (Balance in Tank, Forked Sting)
 Figure 2. - Continued.

d. Tank (T₂₀) Protuberances - Side View
Figure 2. - Continued.



e. Tank (T₂₀) Protuberances - Top View
Figure 2. - Continued.

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1208R

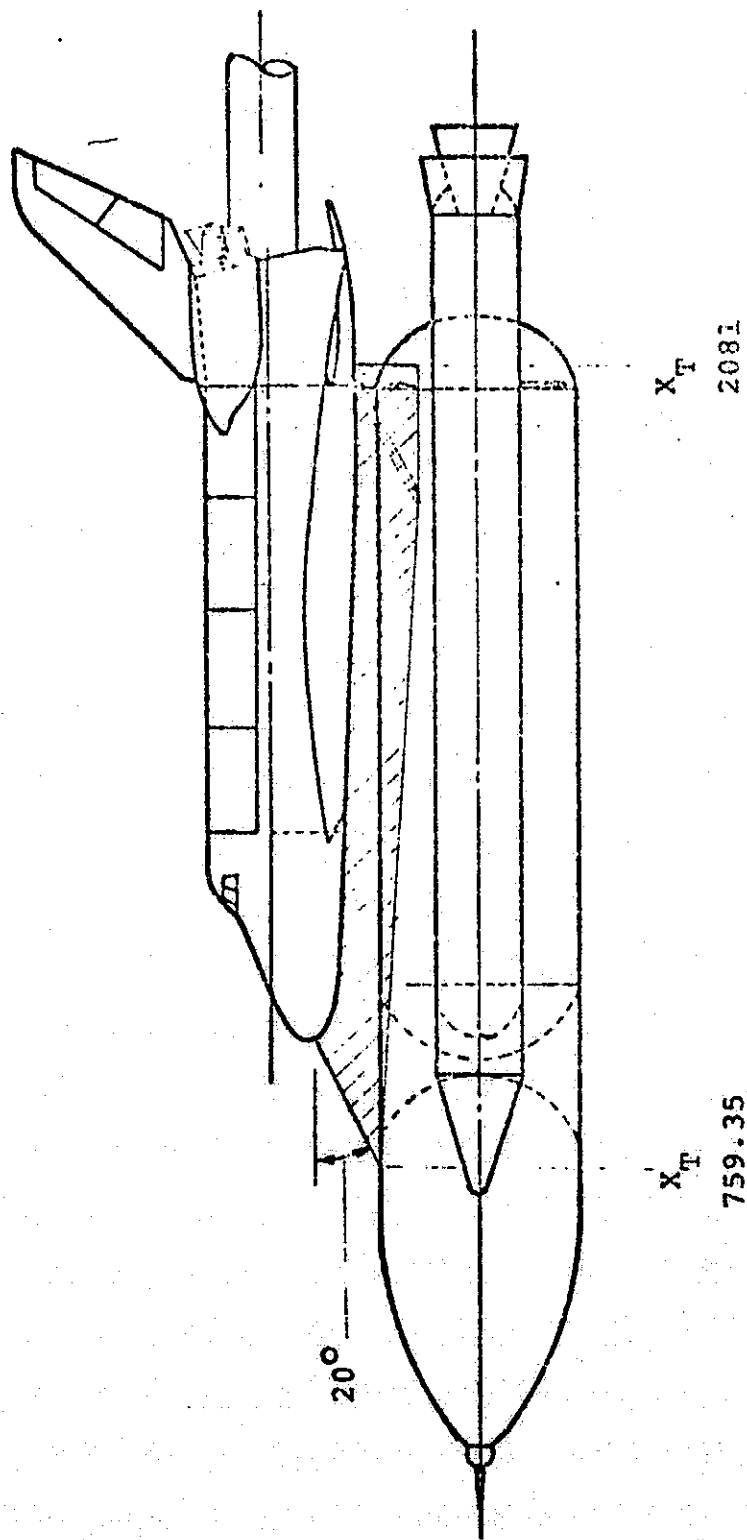
T₂₇

X_T
2175.83

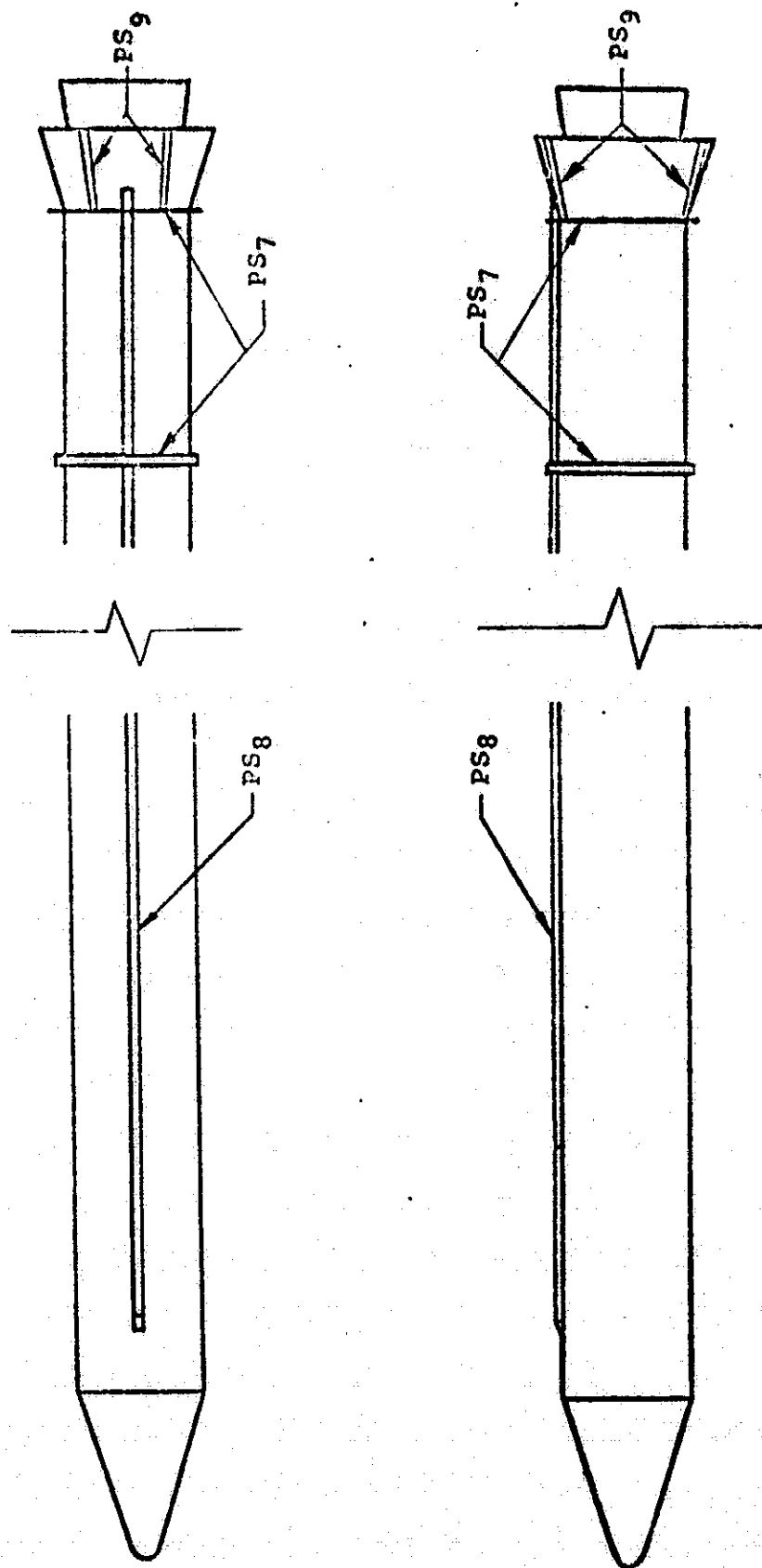
X_T
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PT₂₁

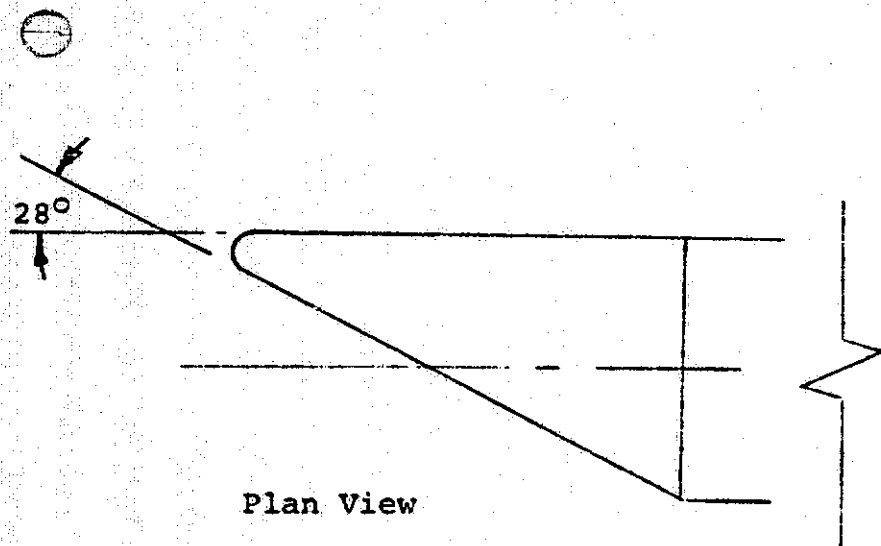
f. Tank Long Ogive Nose (T₂₇) and Base Extension (PT₂₁)
Figure 2. - Continued)



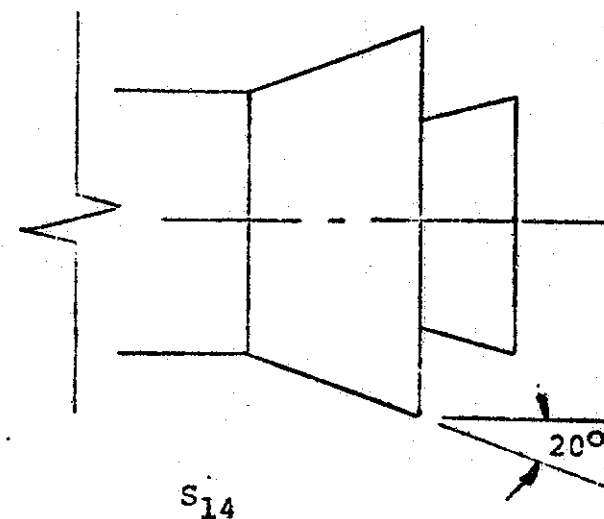
g. Orbiter/Tank Fairing, FRg
Figure 2. - Continued.



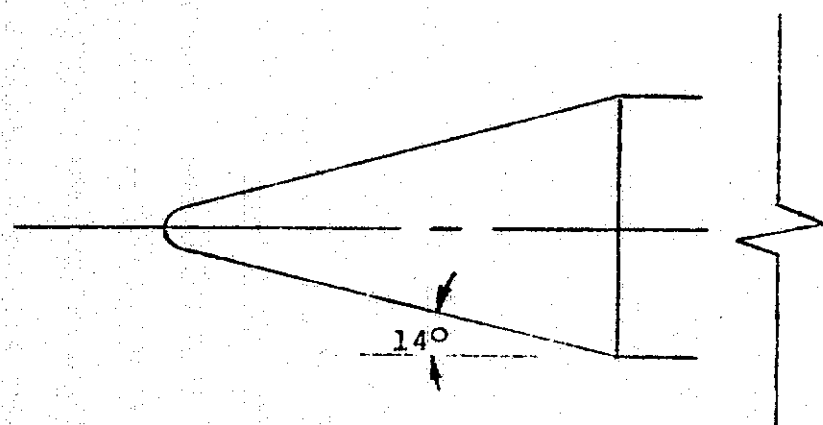
h. SRB (S18) Protuberances
Figure 2. - Continued.



S₁₅



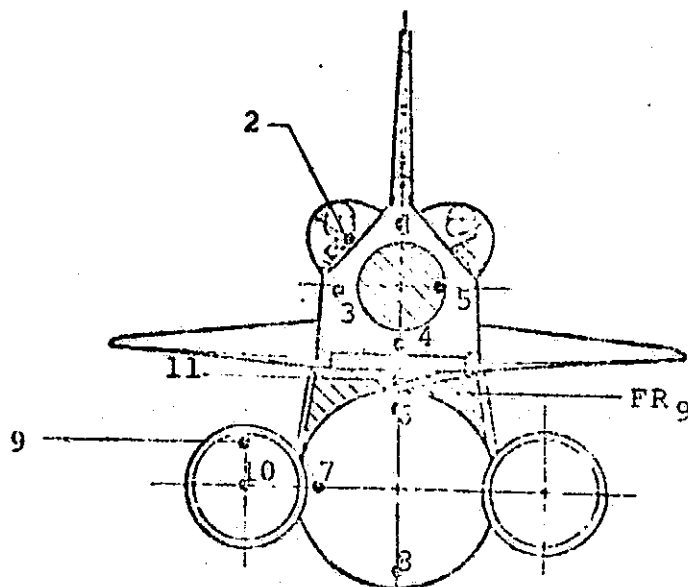
S₁₄



Side View

i. SRB Alternate Nose Shape (S₁₅) and Aft Skirt Flare (S₁₄)

Figure 2. - Continued.



BALANCE IN ORBITER

Manifold tubes as follows:

$$P_{b_o} = 1, 2, 3, 5$$

$$P_{b_{bf}} = 4$$

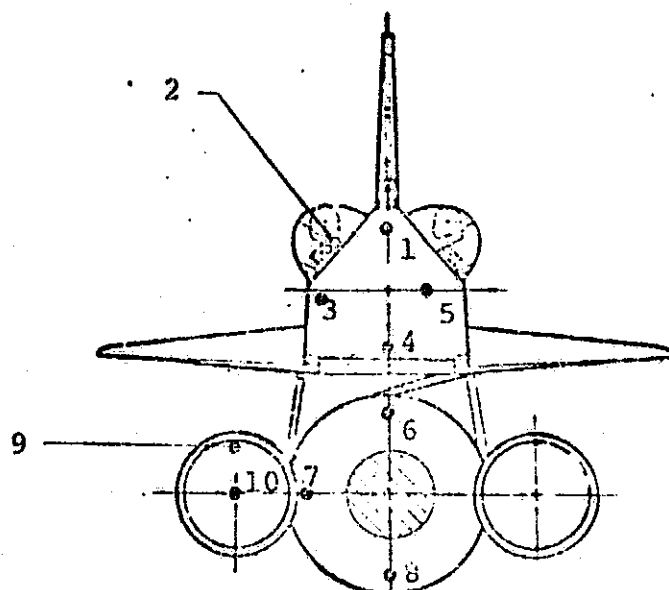
$$P_{b_e} = 6, 7, 8$$

$$P_{b_s} = 9, 10$$

with FR_9 Installed

$$P_{b_f} = 11$$

- j. Definition of Base Pressure Tube Locations, Balance in Orbiter
Figure 2. - Continued.



BALANCE IN TANK (Straight Sting)

Manifold tubes as follows

$$P_{b_o} = 1, 2, 3, 5$$

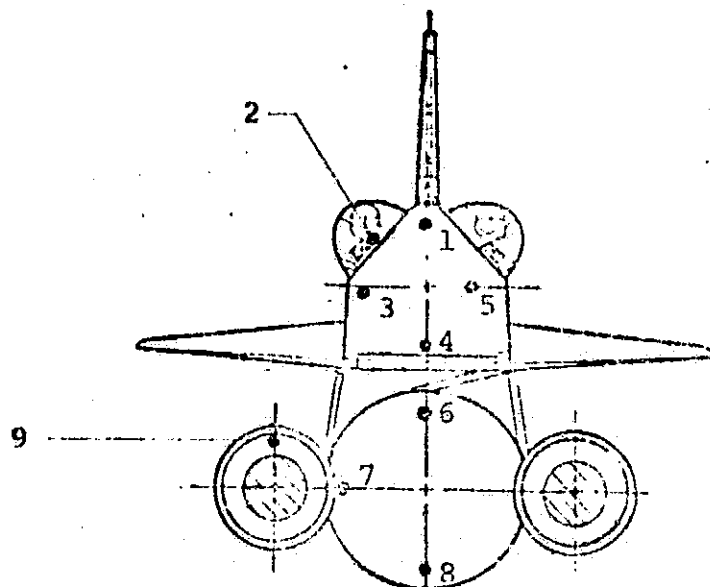
$$P_{b_{bf}} = 4$$

$$P_{b_e} = 6, 7, 8$$

$$P_{b_s} = 9, 10$$

k. Definition of Base Pressure Tube Locations,
Balance in Tank (Straight Sting)

Figure 2. - Continued.



BALANCE IN TANK (Forked Sting)

Manifold tubes as follows:

$$P_{b_o} = 1, 2, 3, 5$$

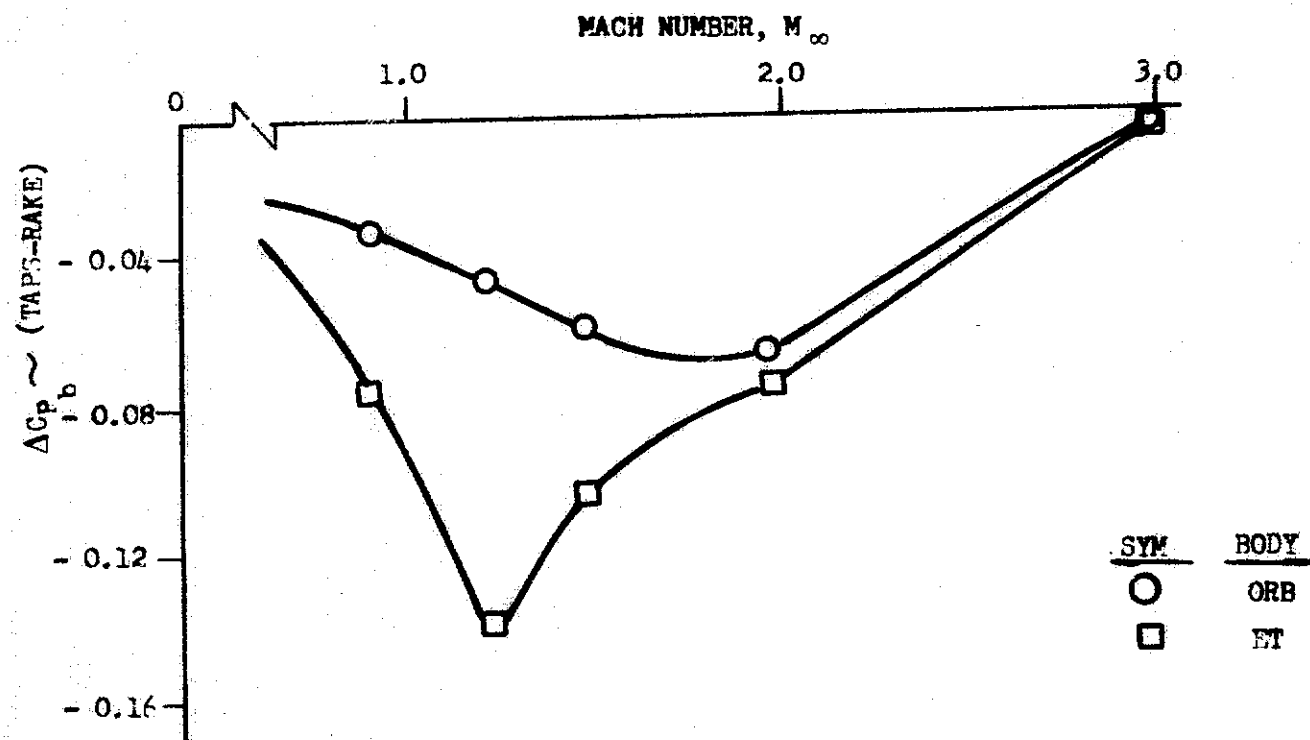
$$P_{b_{bf}} = 4$$

$$P_{b_e} = 6, 7, 8$$

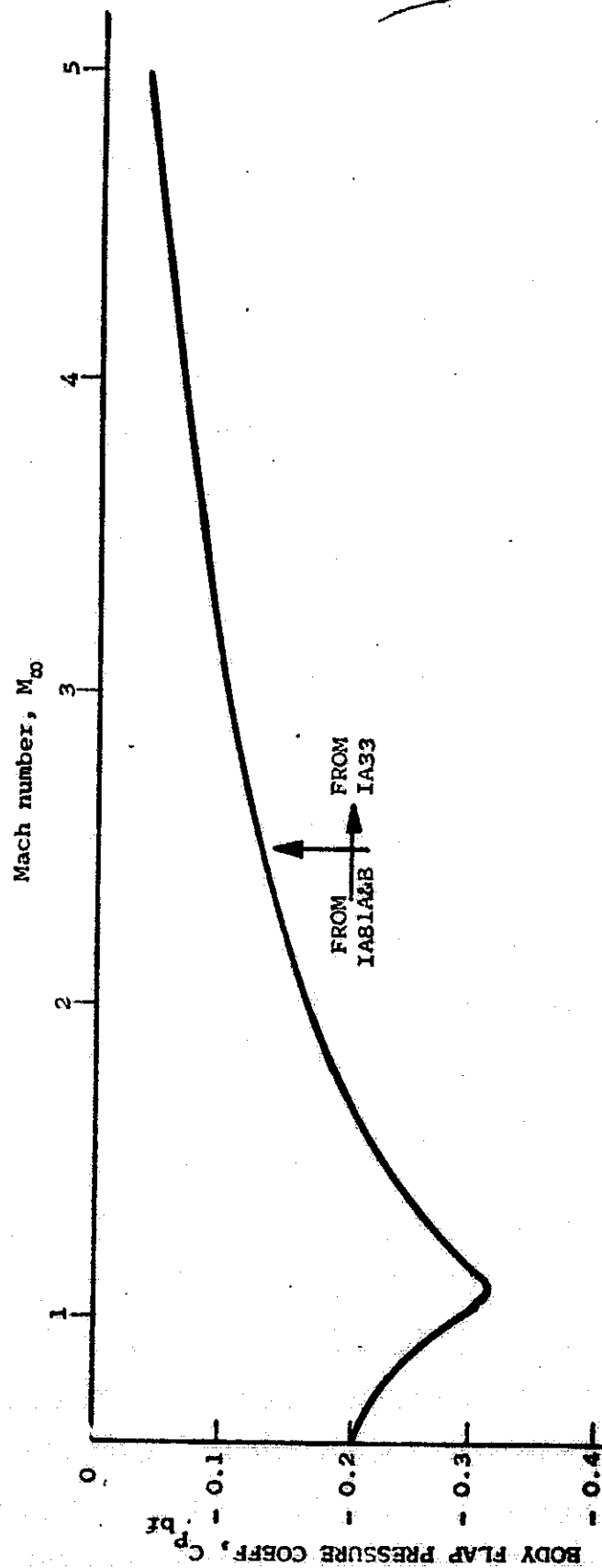
$$P_{b_s} = 9$$

1. Definition of Base Pressure Tube Locations,
Balance in Tank (Forked Sting)

Figure 2. - Continued.

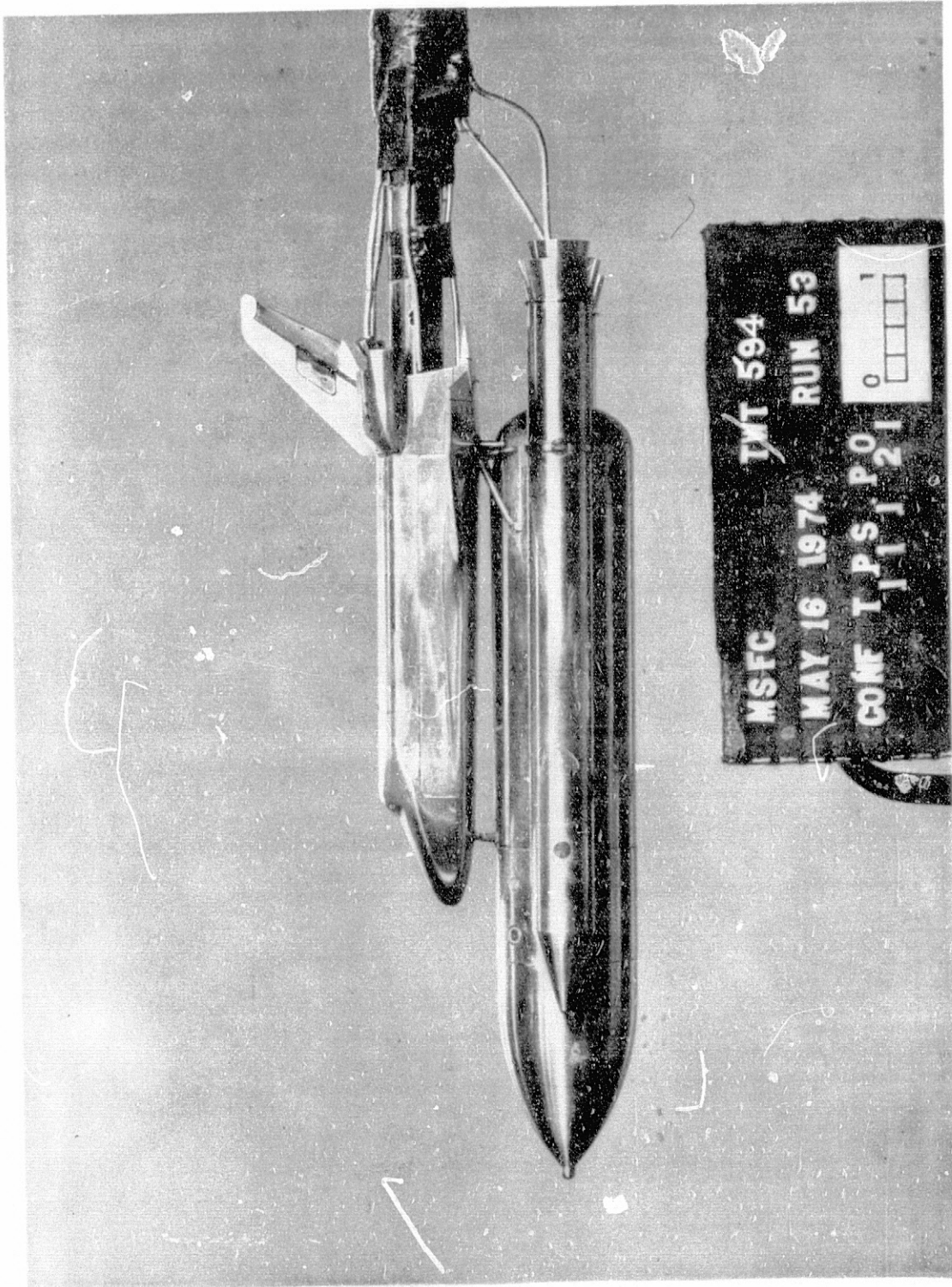


m. Base Pressure Coefficient Increment Due to Difference
Between Pressure Taps and Rake
Figure 2. - Continued.

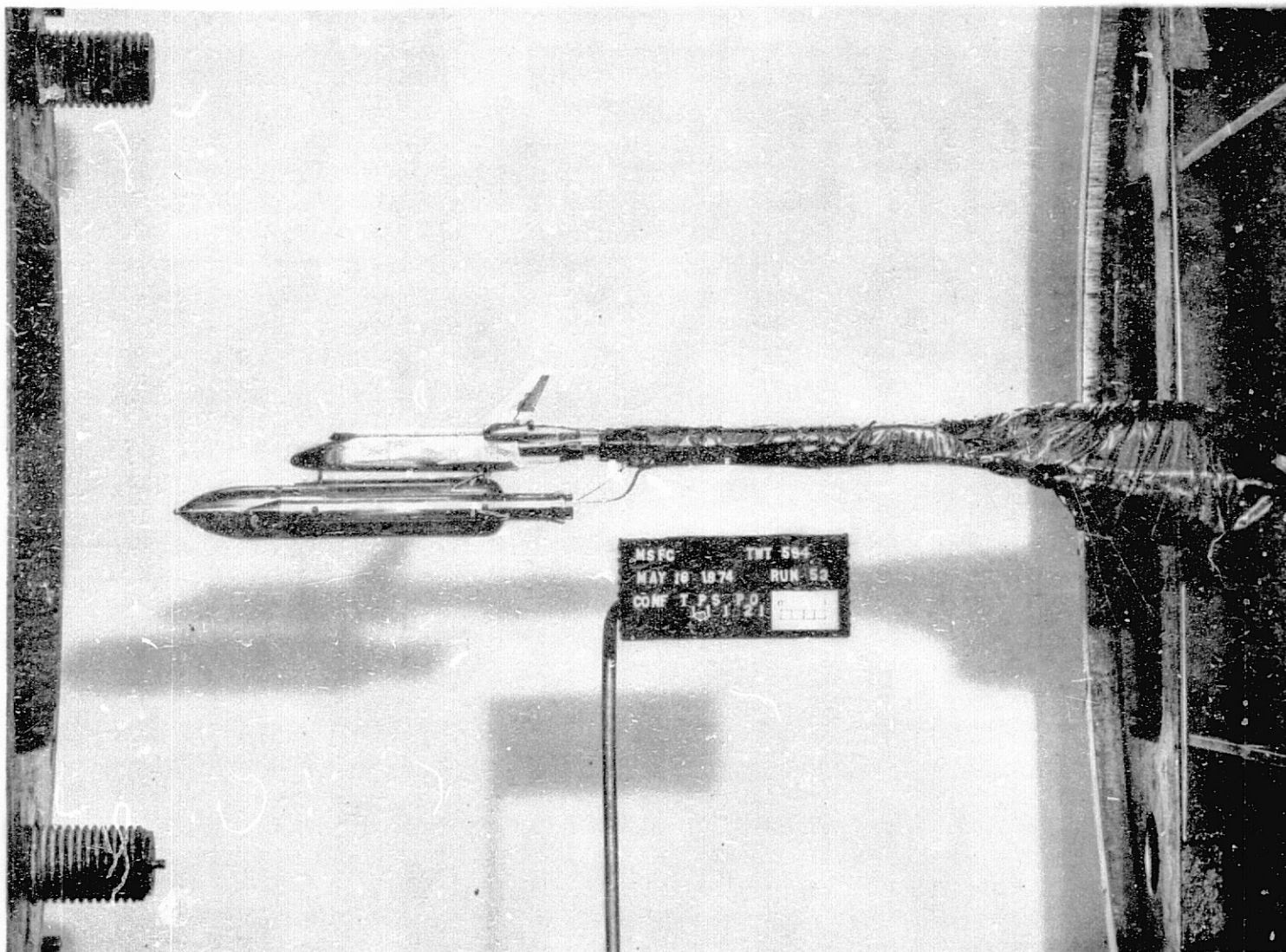


n. Orbiter Body Flap Pressure Coefficients

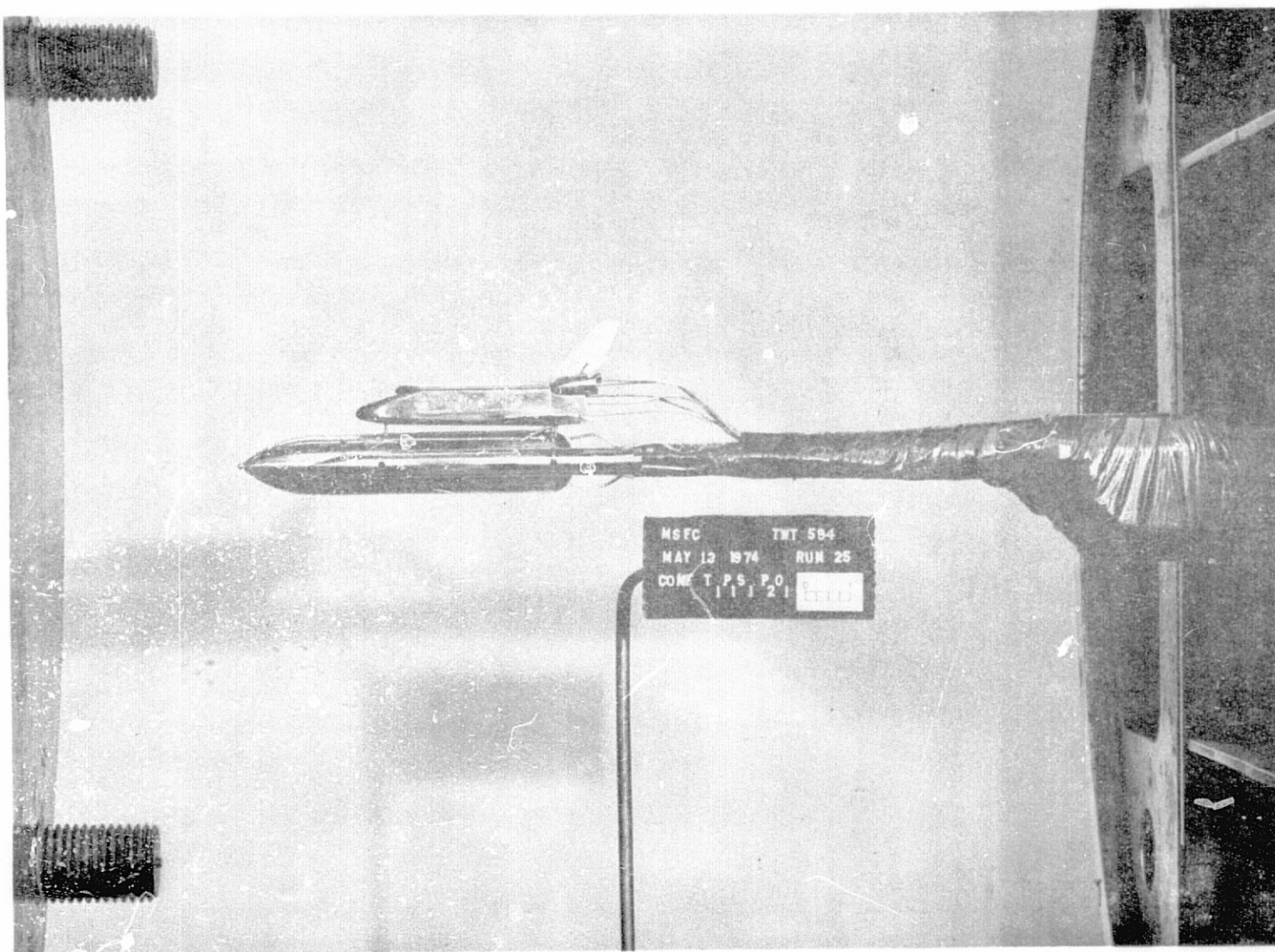
Figure 2. - Concluded.



a. Photograph of Configuration T1P1S1P201
Figure 3. - Model Photographs.



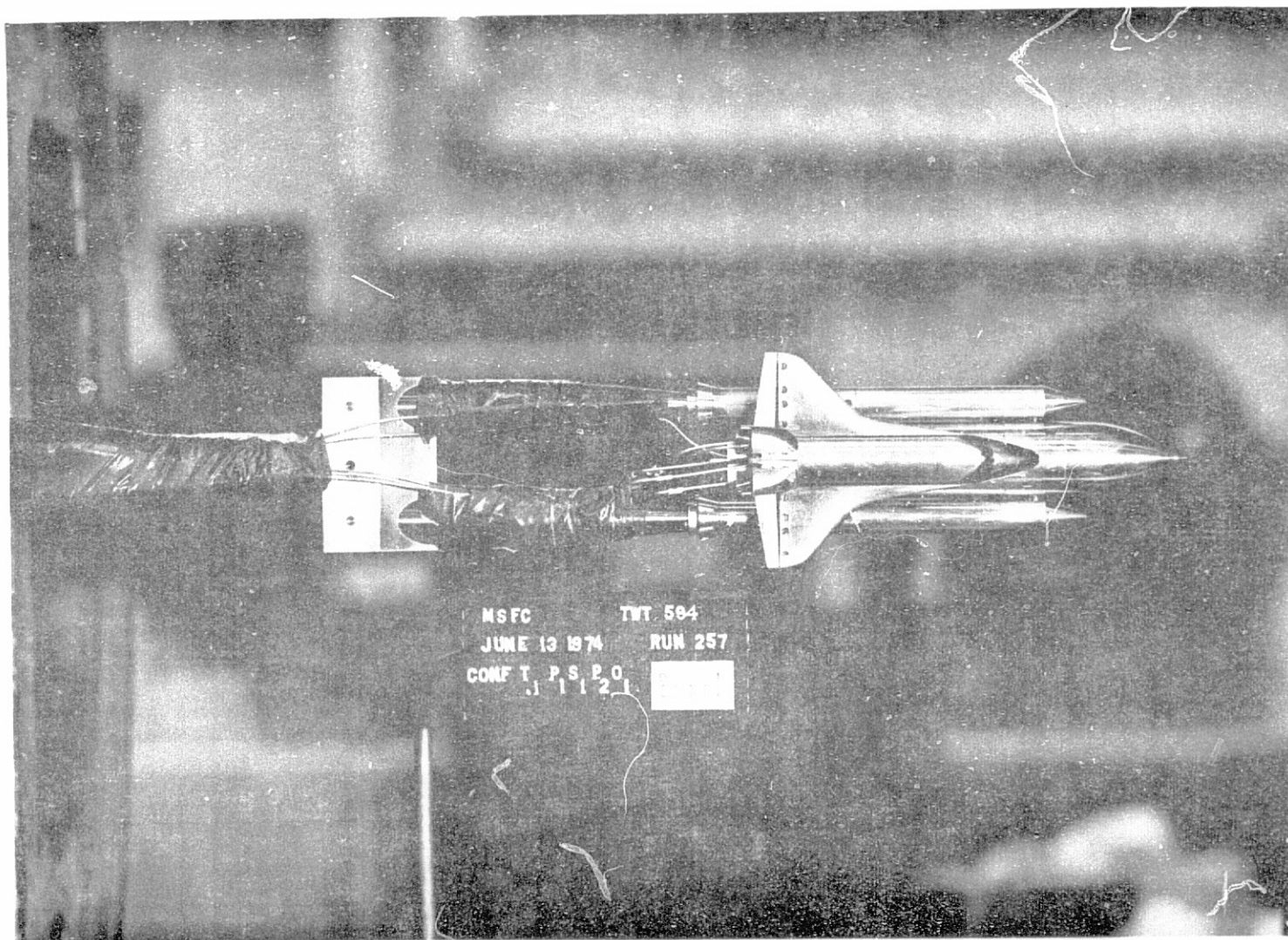
b. Photograph of Tunnel Installation of Launch Vehicle
Model (Balance In Orbiter)
Figure 3. - Continued.



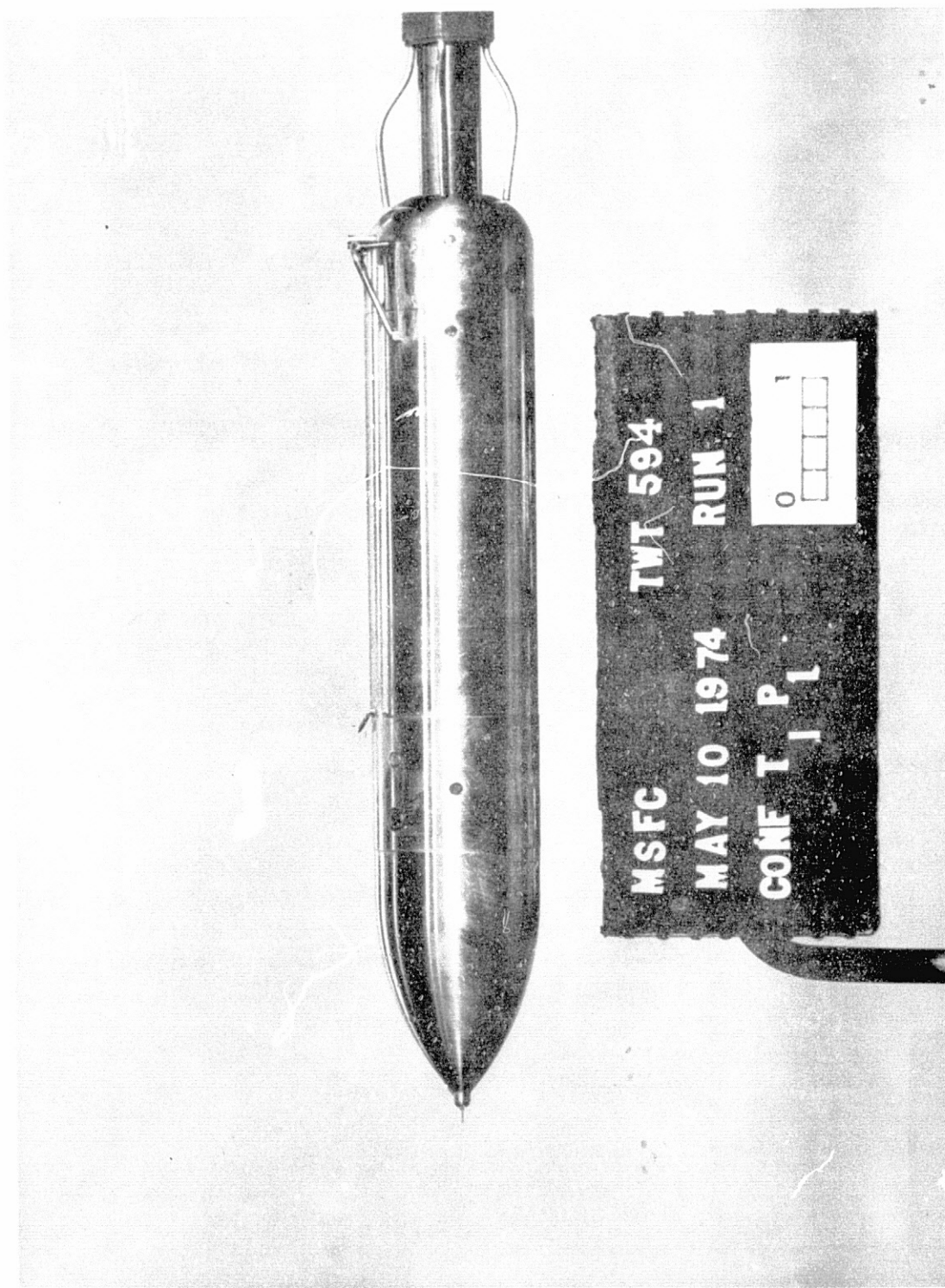
c. Photograph of Tunnel Installation of Launch Vehicle
Model (Balance In Tank)
Figure 3. - Continued.

C-2
ORIGINAL PAGE IS
OF POOR QUALITY

94



d. Photograph of Tunnel Installation of Launch Vehicle
Model (Balance In Tank, Forked Sting)
Figure 3. - Continued.



e. Photograph of Configuration T₁P₁
Figure 3. - Concluded.

DATA FIGURES

Volume 1 - Figures 4-12
Volume 2 - Figures 13-26

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(VIC001)	MSFC S94(A33) 740TS (TIP1)	ET STING
(VIC004)	MSFC S94(A33) 740TS (TIPISIP2)	ET STING
(VIC005)	MSFC S94(A33) 740TS (TIP101)	ORB STING
(VIC007)	MSFC S94(A33) 740TS (TIPISIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

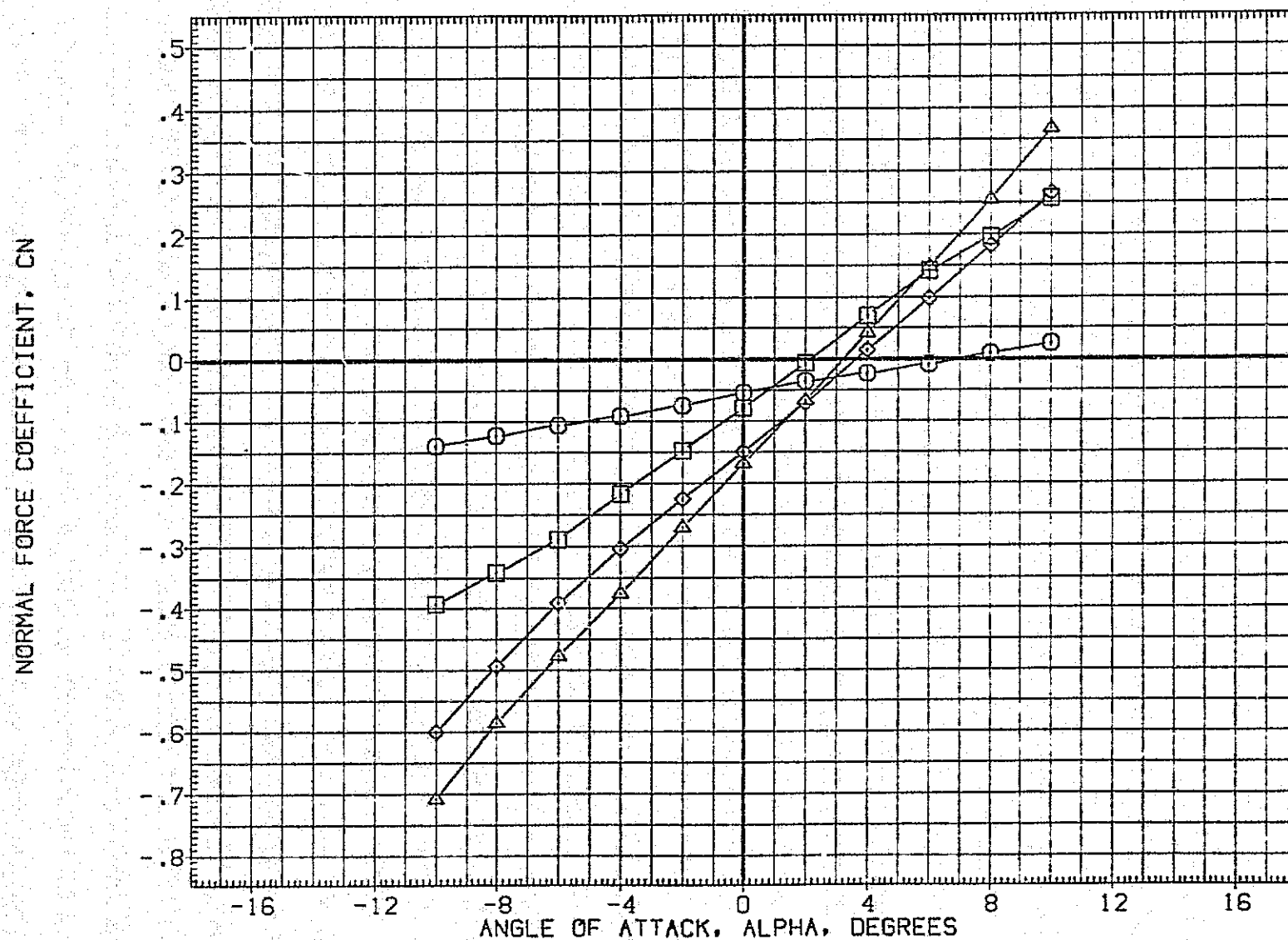


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	DATA NOT AVAILABLE
(VIC004)	DATA NOT AVAILABLE
(VIC005)	DATA NOT AVAILABLE
(VIC007)	MSFC 594(1A33) 740TS (TIP1SIP201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

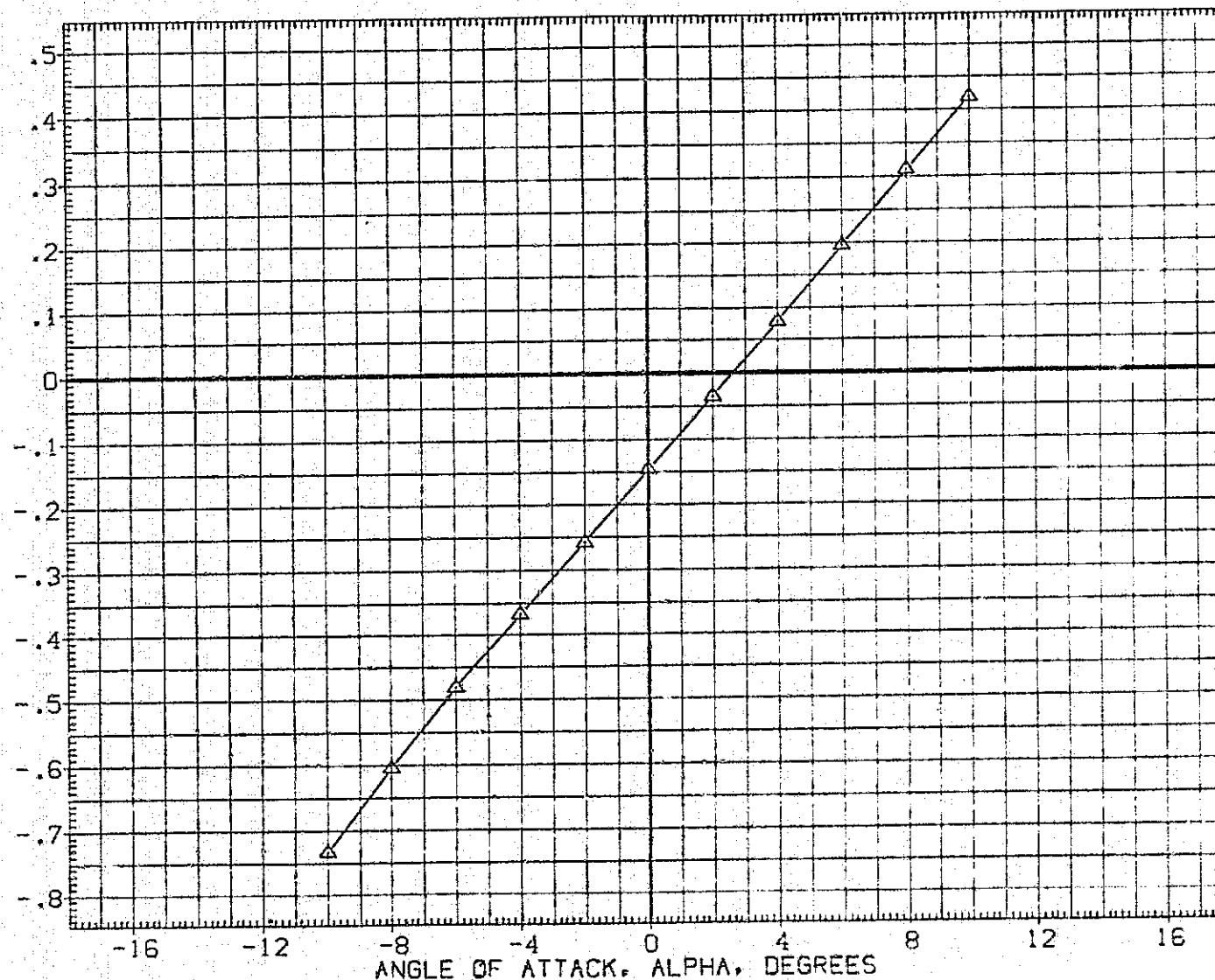


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STRING
(VIC001)	MSFC 594(I A33) 740TS (TIP1)	ET STRING
(VIC004)	MSFC 594(I A33) 740TS (TIPISIP2)	ET STRING
(VIC005)	MSFC 594(I A33) 740TS (TIP101)	ORB STRING
(VIC007)	MSFC 594(I A33) 740TS (TIPISIP201)	ORB STRING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

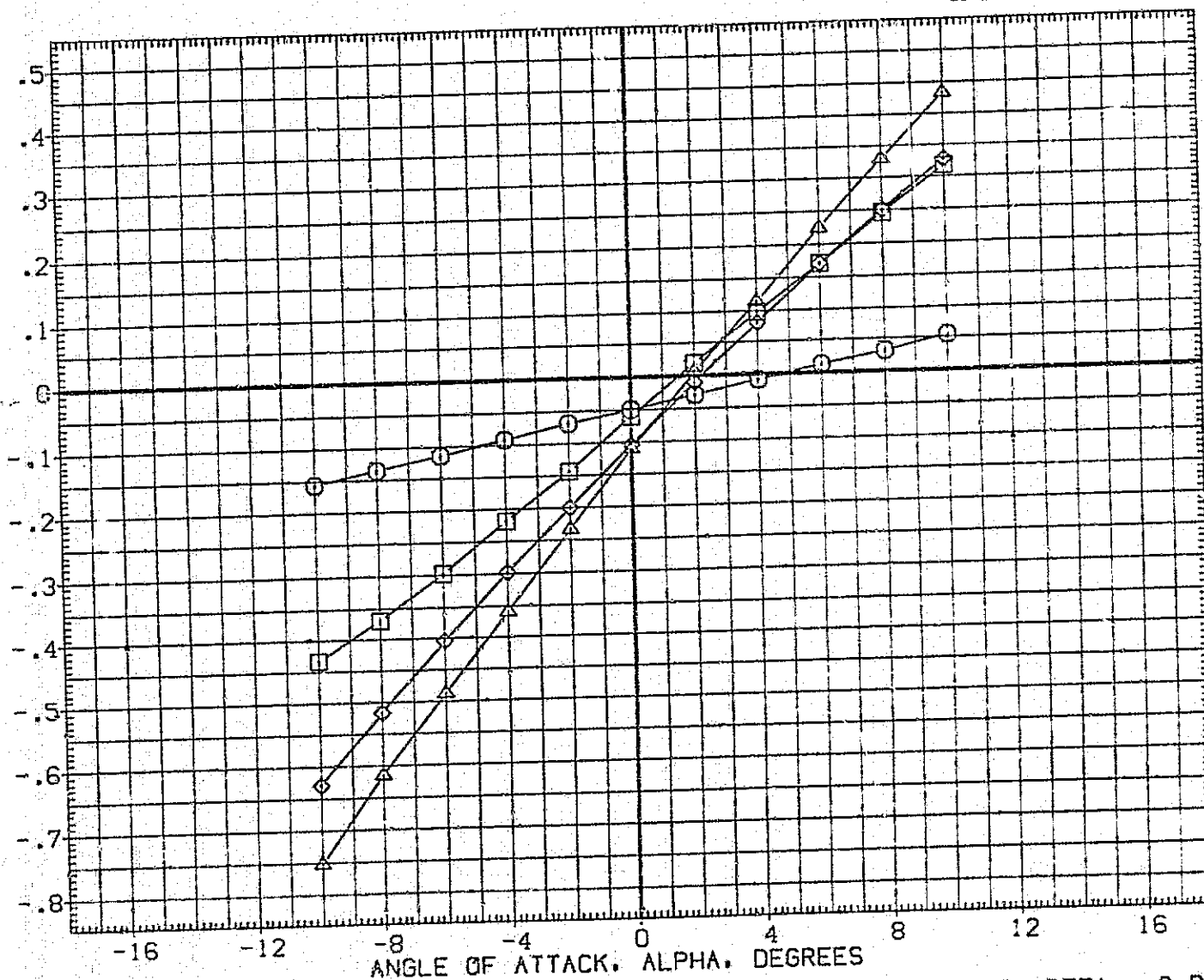


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(A33) 740TS (TIP1)
(VIC004)	MSFC 594(A33) 740TS (TIPISIP2)
(VIC005)	MSFC 594(A33) 740TS (TIP101)
(VIC007)	MSFC 594(A33) 740TS (TIPISIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRF	976.0000 IN. XT
YMRF	.0000 IN. YT
ZMRF	400.0000 IN. ZT
SCALE	.0040

NORMAL FORCE COEFFICIENT, CN

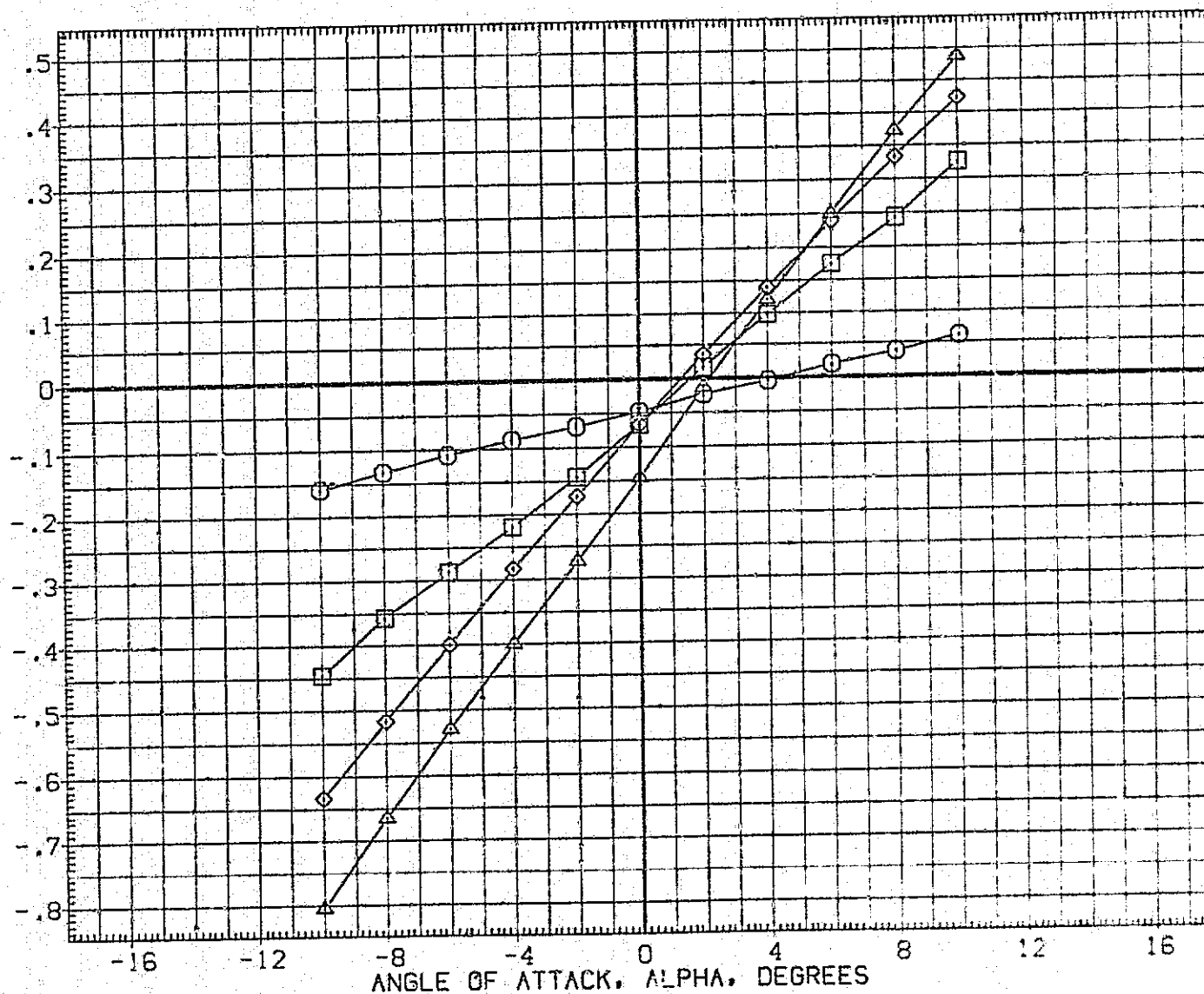


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(D)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001) ○	MSFC 594(IA33) 740TS (TIP1)
(VIC004) □	MSFC 594(IA33) 740TS (TIPISIP2)
(VIC005) ◇	MSFC 594(IA33) 740TS (TIP101)
(VIC007) △	MSFC 594(IA33) 740TS (TIPISIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
YMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

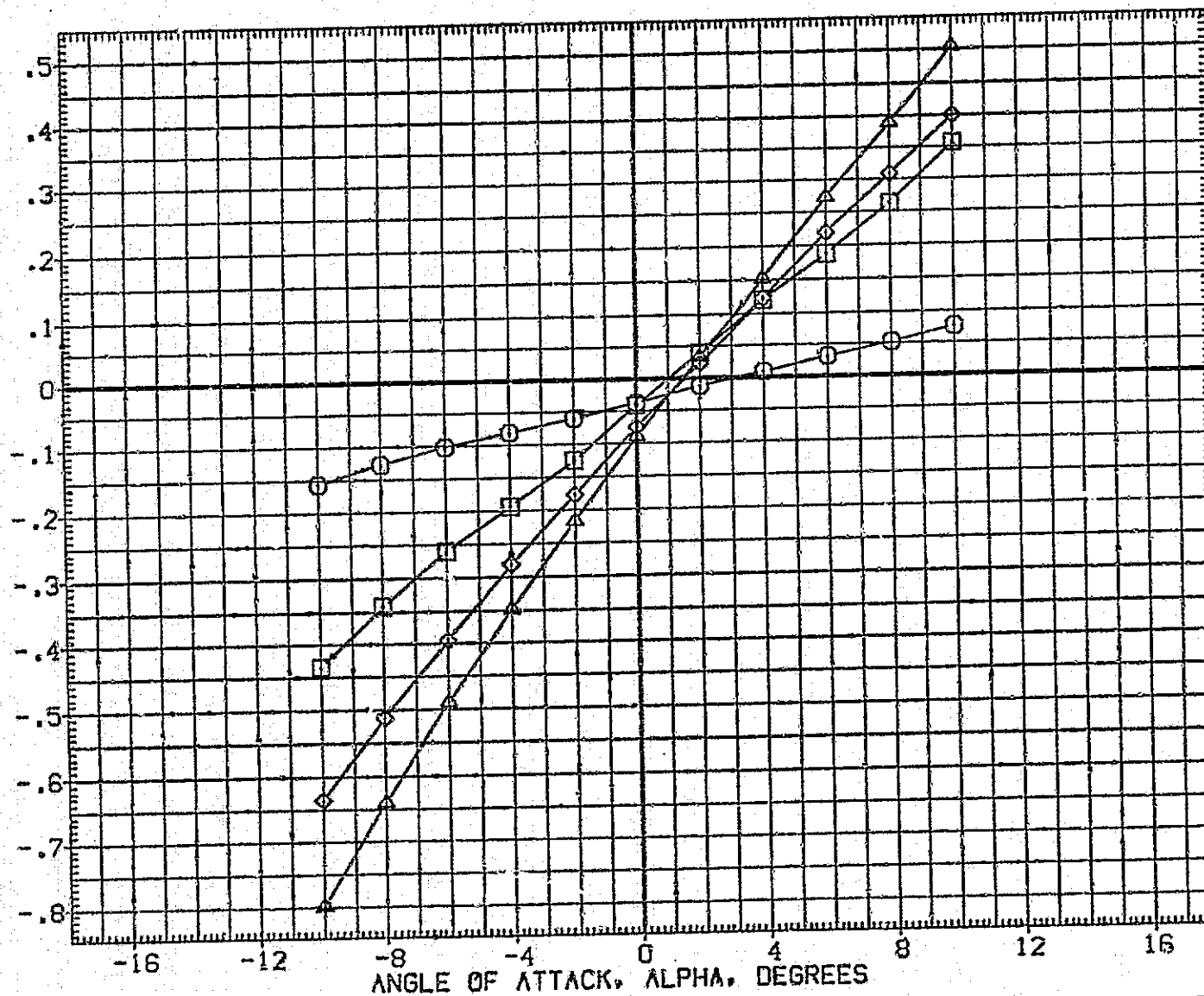


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (E)MACH = 1.25

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC001) □ DATA NOT AVAILABLE
 (VIC004) □ DATA NOT AVAILABLE
 (VIC005) □ DATA NOT AVAILABLE
 (VIC007) △ MSFC 594(1A33) 740TS (TIPISIP201)

ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 YMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

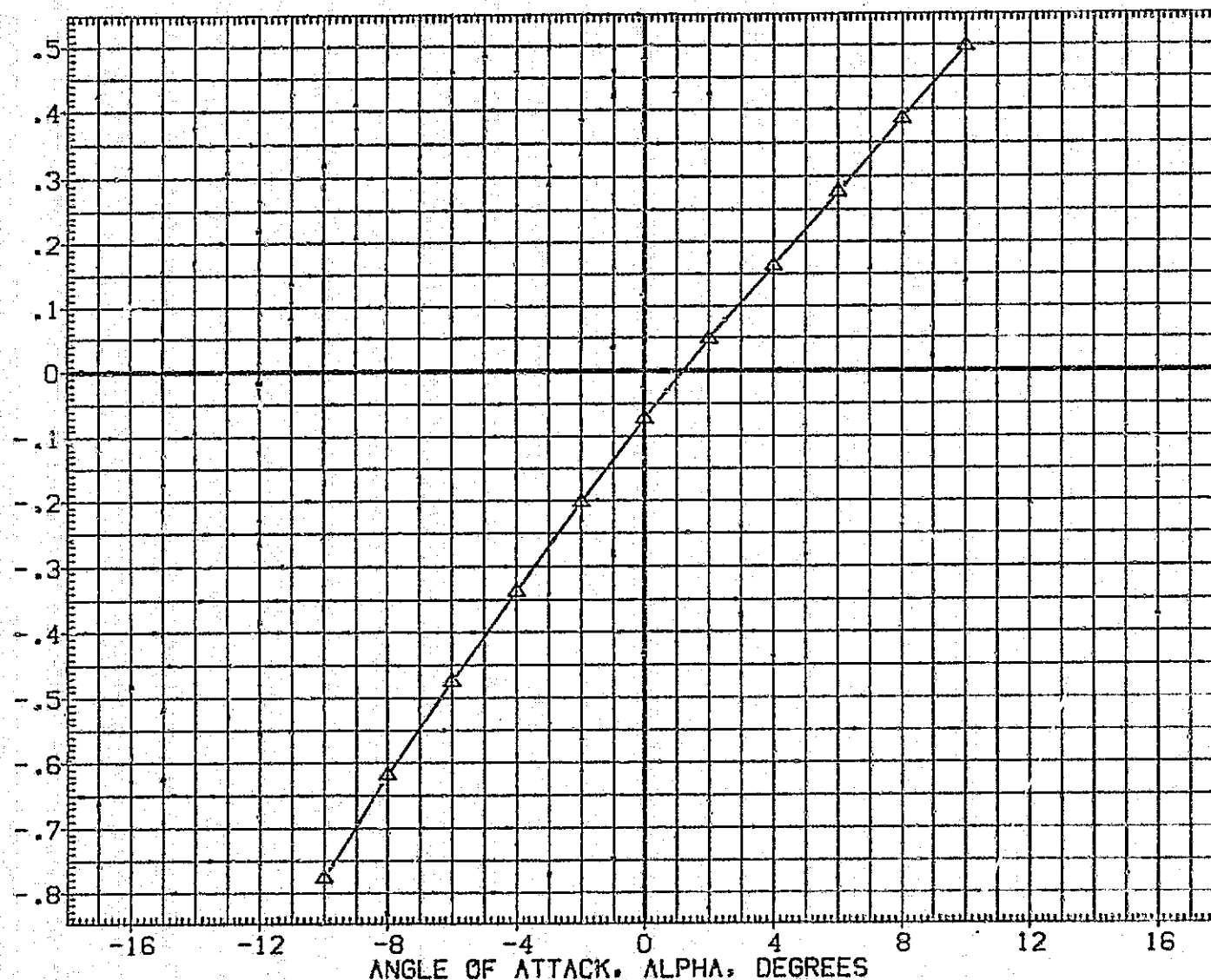


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (F)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(1A33) 740TS (TIP1)
(VIC004)	MSFC 594(1A33) 740TS (TIP1SIP2)
(VIC005)	MSFC 594(1A33) 740TS (TIP101)
(VIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

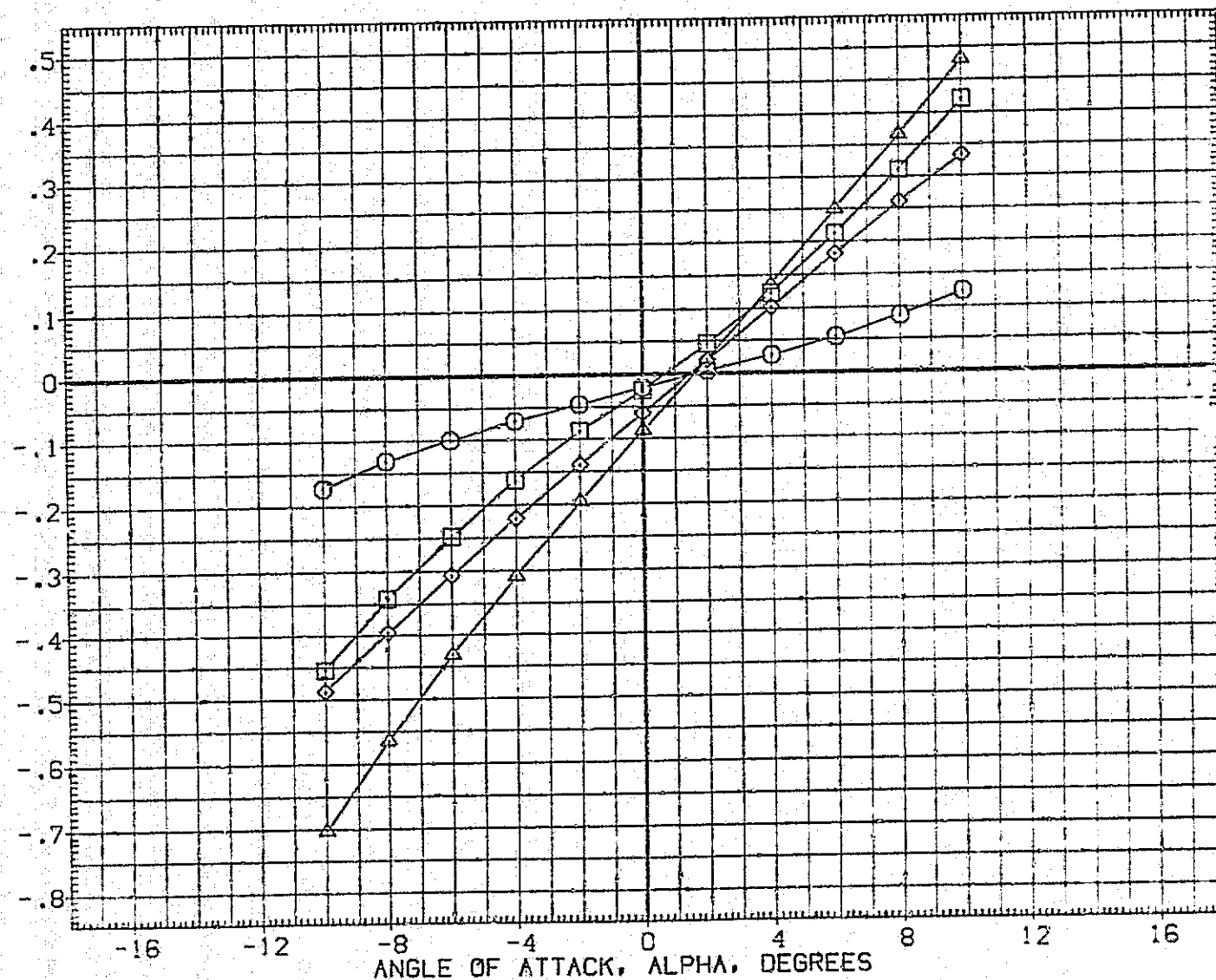


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (G)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
[VIC001]	MSFC 594(1A33) 740TS (TIP1)
[VIC004]	MSFC 594(1A33) 740TS (TIP1SIP2)
[VIC005]	MSFC 594(1A33) 740TS (TIP101)
[VIC007]	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	3693.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

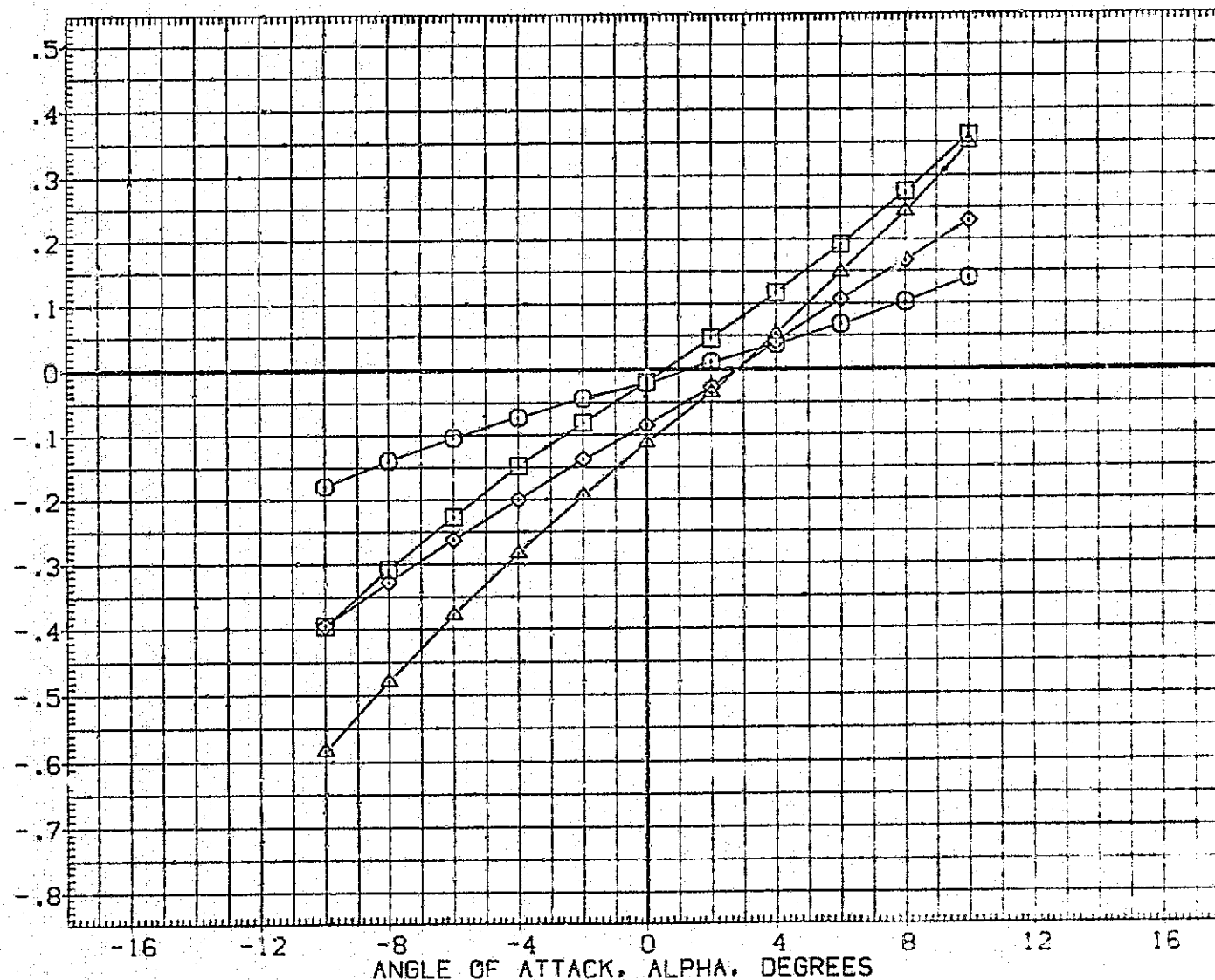


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (H)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(VIC001)	MSFC 594(1A33) 740TS (TIP1)	ET STING
(VIC004)	MSFC 594(1A33) 740TS (TIP1SIP2)	ET STING
(VIC005)	MSFC 594(1A33) 740TS (TIP101)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

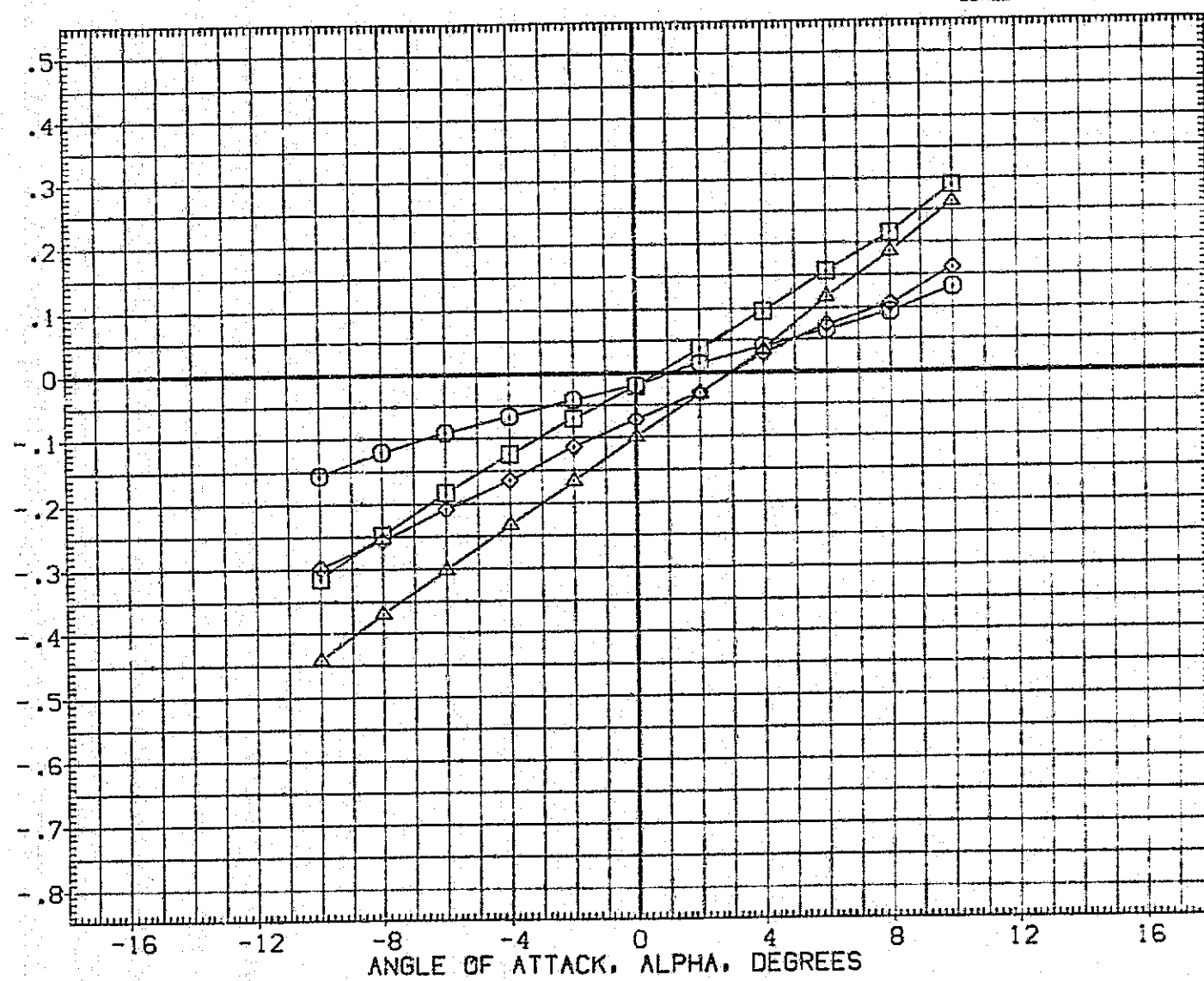


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (1)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
{VIC001}	MSFC 594{IA33} 740TS {TIP1}
{VIC004}	MSFC 594{IA33} 740TS {TIPISIP2}
{VIC005}	MSFC 594{IA33} 740TS {TIP101}
{VIC007}	MSFC 594{IA33} 740TS {TIPISIP201}

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

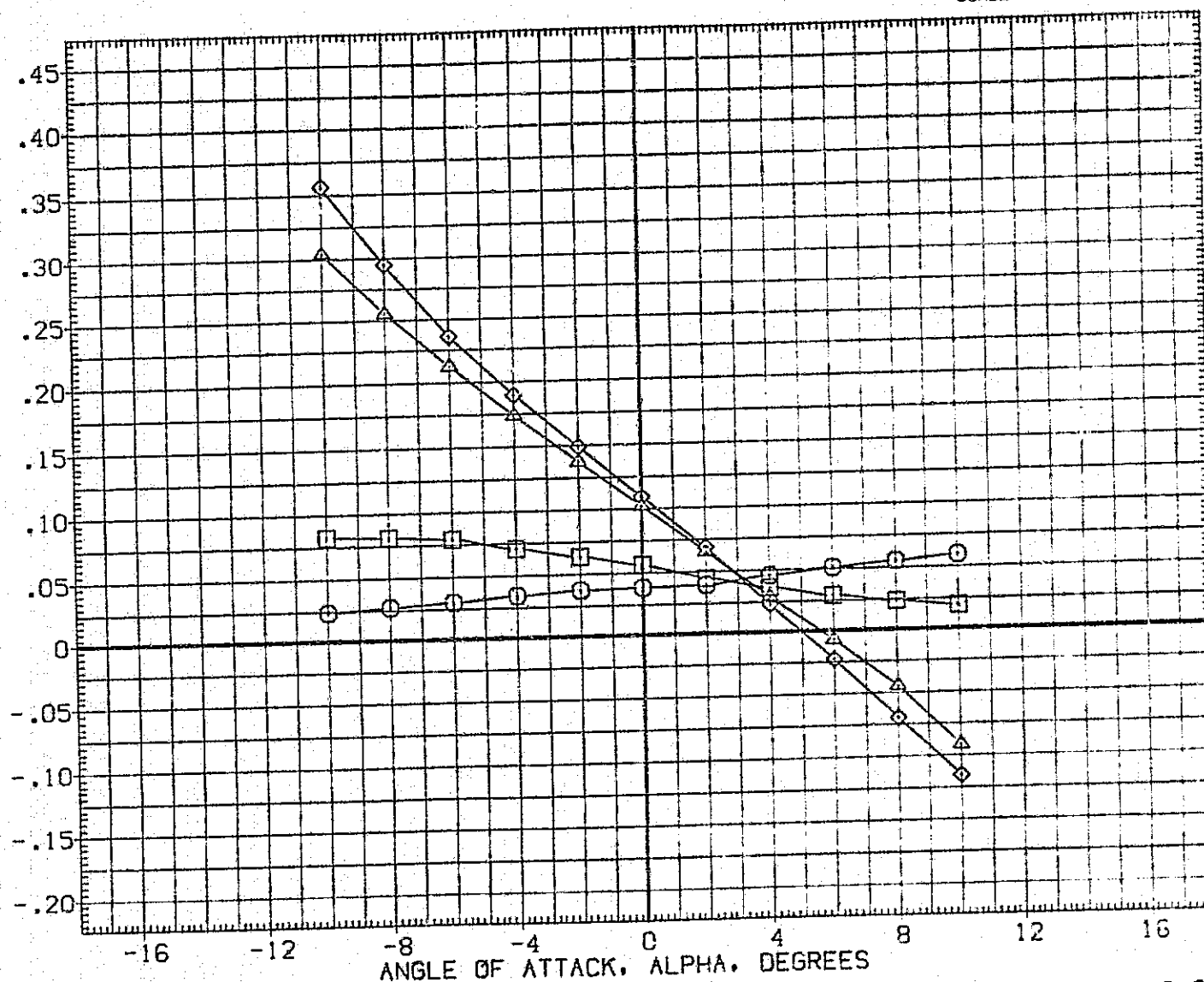


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001) ○	DATA NOT AVAILABLE
(VIC004) □	DATA NOT AVAILABLE
(VIC005) ◇	DATA NOT AVAILABLE
(VIC007) △	MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0340	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

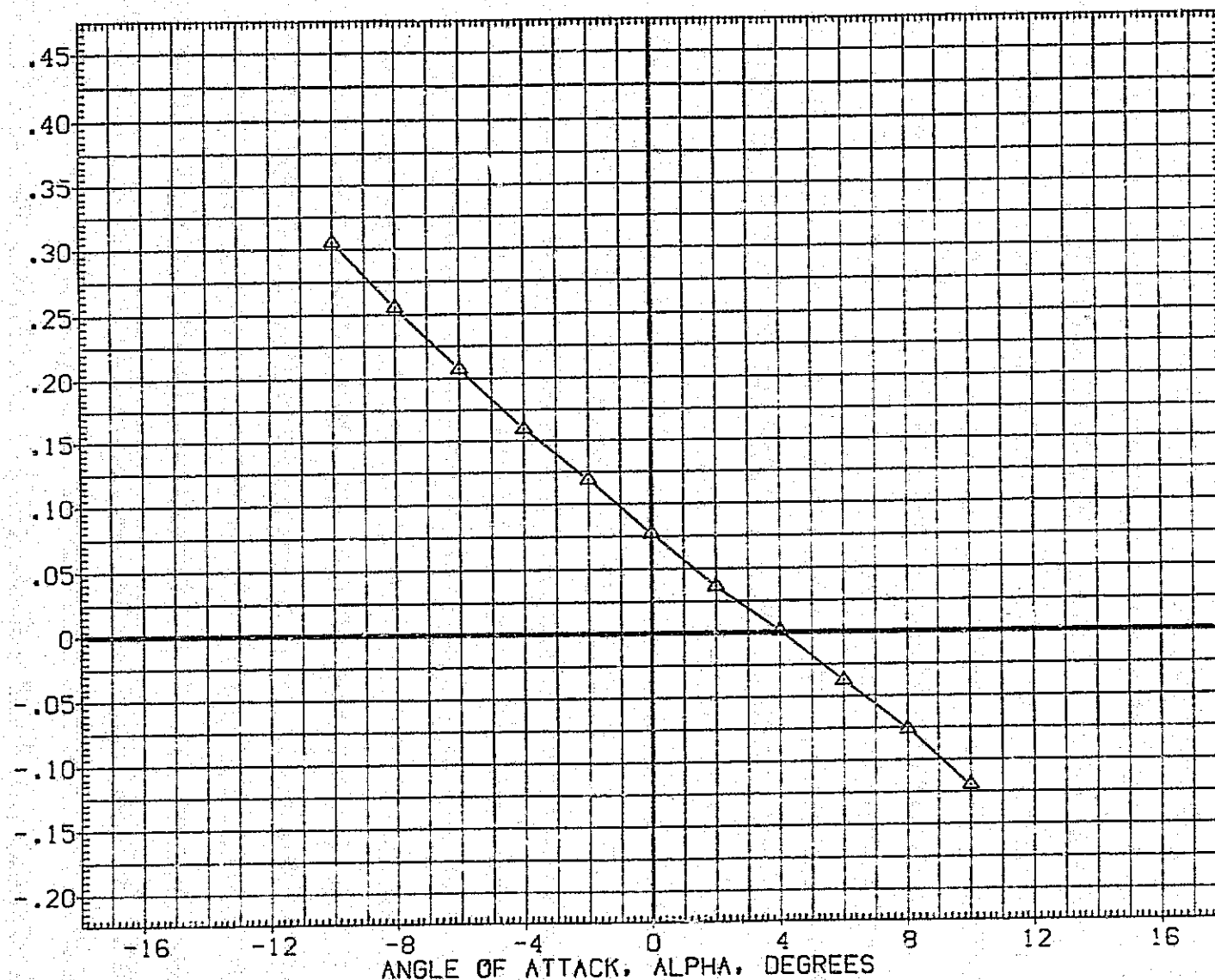


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
[VIC001]	MSFC 594(1A33) 740TS (TIP1)
[VIC004]	MSFC 594(1A33) 740TS (TIP1SIP2)
[VIC005]	MSFC 594(1A33) 740TS (TIP101)
[VIC007]	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
YMRP	976.0000	IN. XT
ZMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

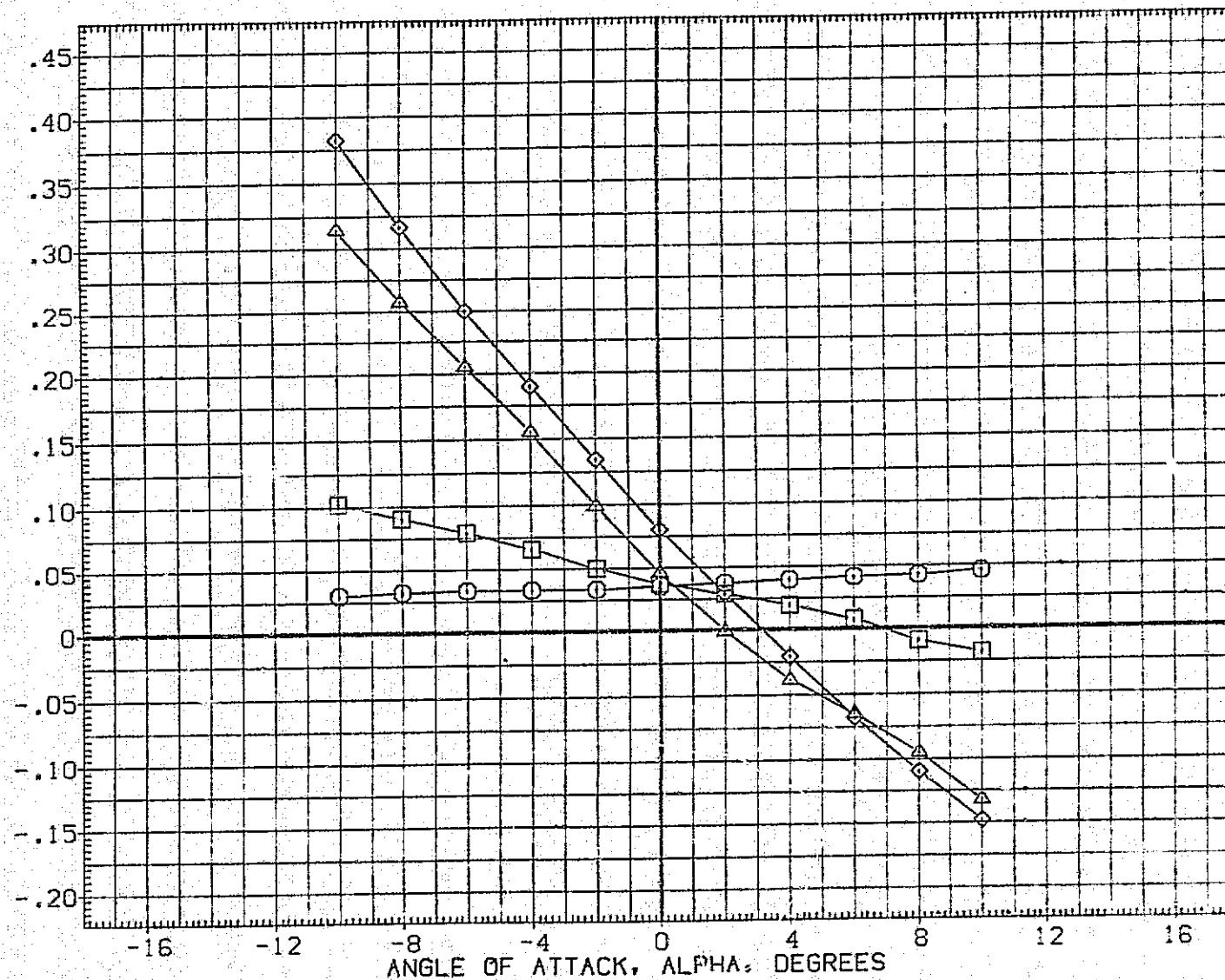


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (C)MACH = .90

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC001)	□	MSFC 594(1A33) 740TS (TIP1)	ET STING
(VIC004)	□	MSFC 594(1A33) 740TS (TIP1SIP2)	ET STING
(VIC005)	△	MSFC 594(1A33) 740TS (TIP101)	ORB STING
(VIC007)	△	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

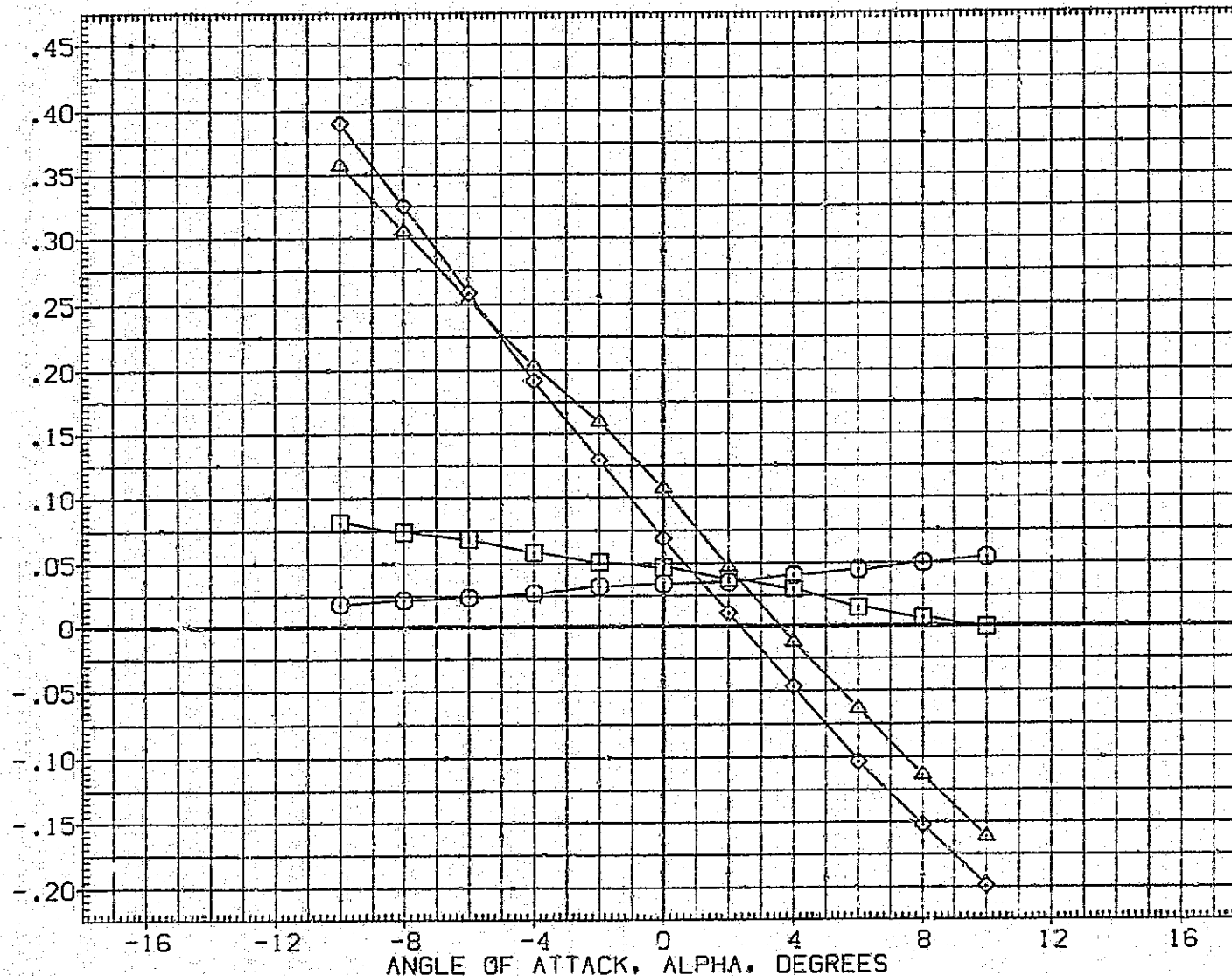


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(D)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594((A33) 740TS (TIP1))
(VIC004)	MSFC 594((A33) 740TS (TIP1SIP2))
(VIC005)	MSFC 594((A33) 740TS (TIP101))
(VIC007)	MSFC 594((A33) 740TS (TIP1SIP201))

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

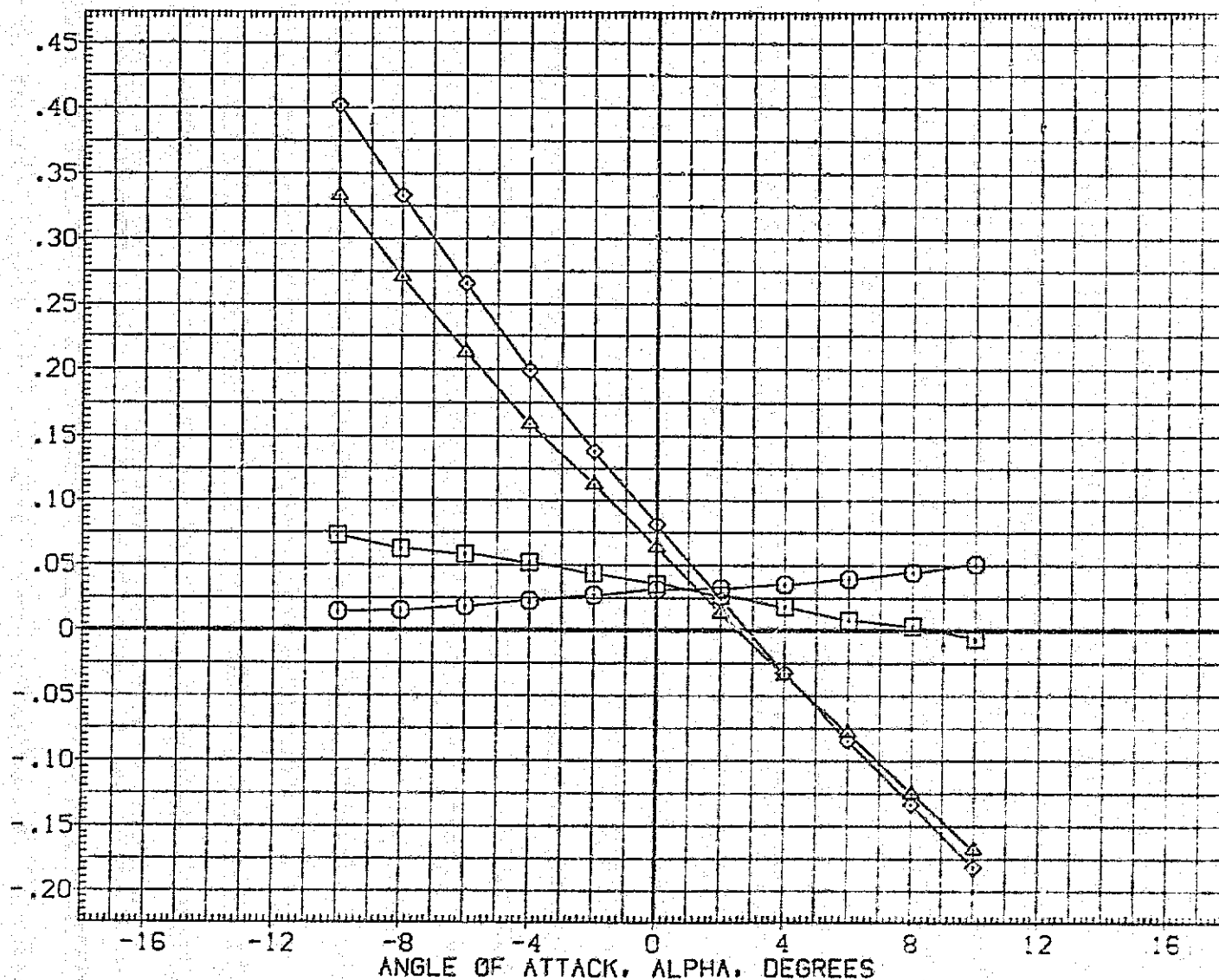


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(E)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	DATA NOT AVAILABLE
(VIC004)	DATA NOT AVAILABLE
(VIC005)	DATA NOT AVAILABLE
(VIC007)	MSFC 594(1A33) 743TS (TIPISIP201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

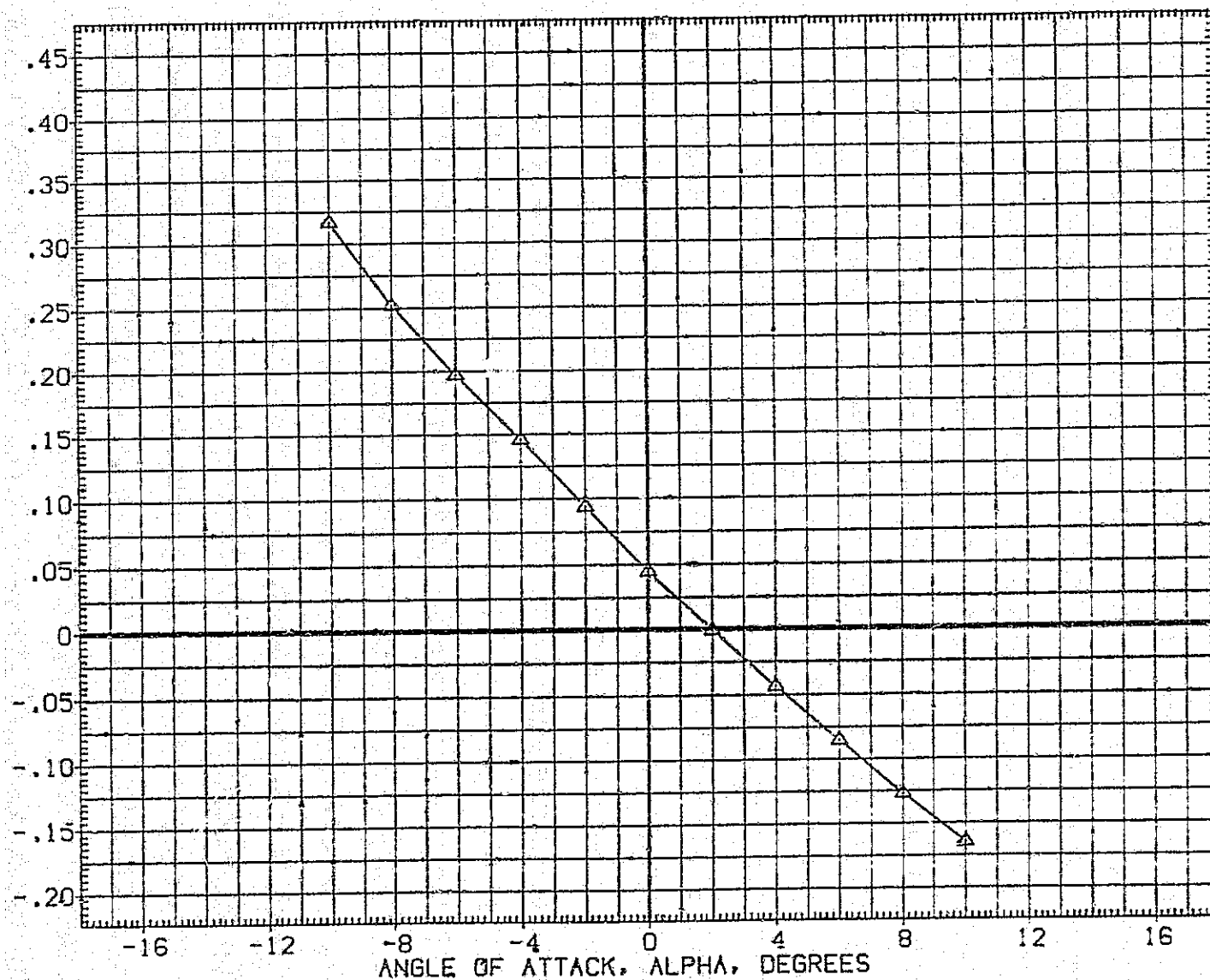


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(F)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001) ○	MSFC 594(1A33) 740TS (TIP1)
(VIC004) □	MSFC 594(1A33) 740TS (TIP1SIP2)
(VIC005) ◇	MSFC 594(1A33) 740TS (TIP101)
(VIC007) △	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

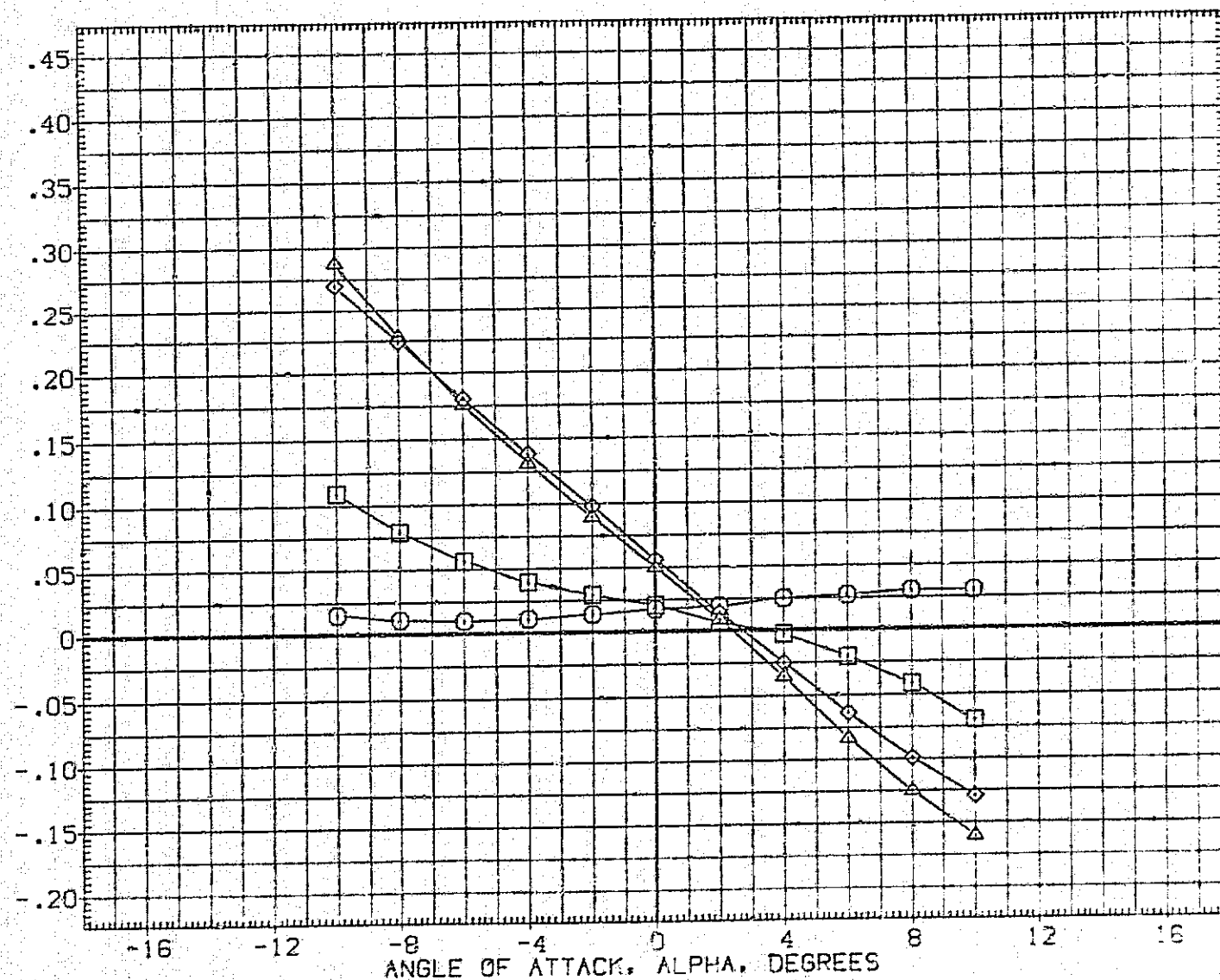


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (G)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(A33) 740TS (TIP1)
(VIC004)	MSFC 594(A33) 740TS (TIP1P2)
(VIC005)	MSFC 594(A33) 740TS (TIP101)
(VIC007)	MSFC 594(A33) 740TS (TIP1P201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. YT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

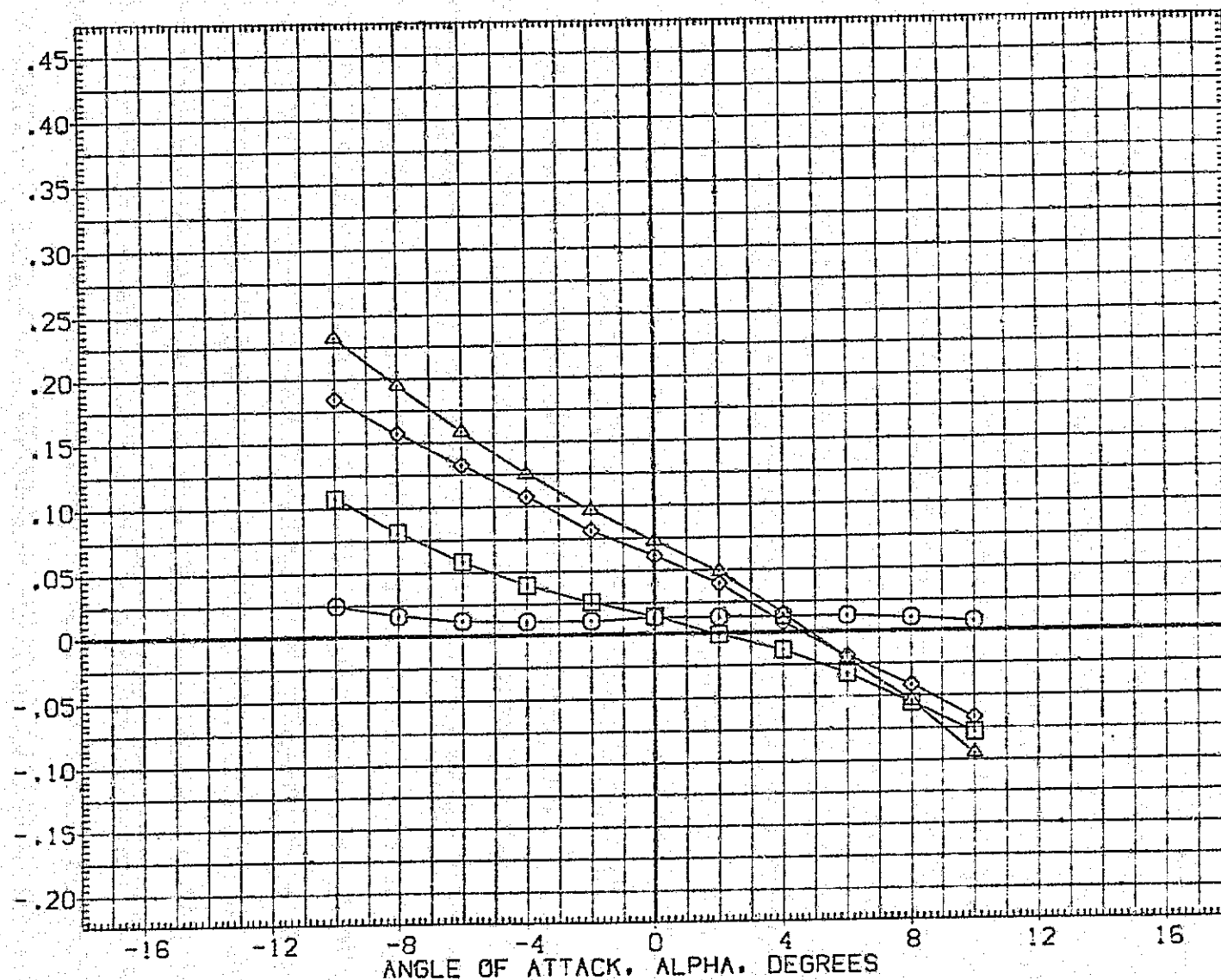


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (H)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(1A33) 740TS (TIP1)
(VIC004)	MSFC 594(1A33) 740TS (TIPISIP2)
(VIC005)	MSFC 594(1A33) 740TS (TIP101)
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

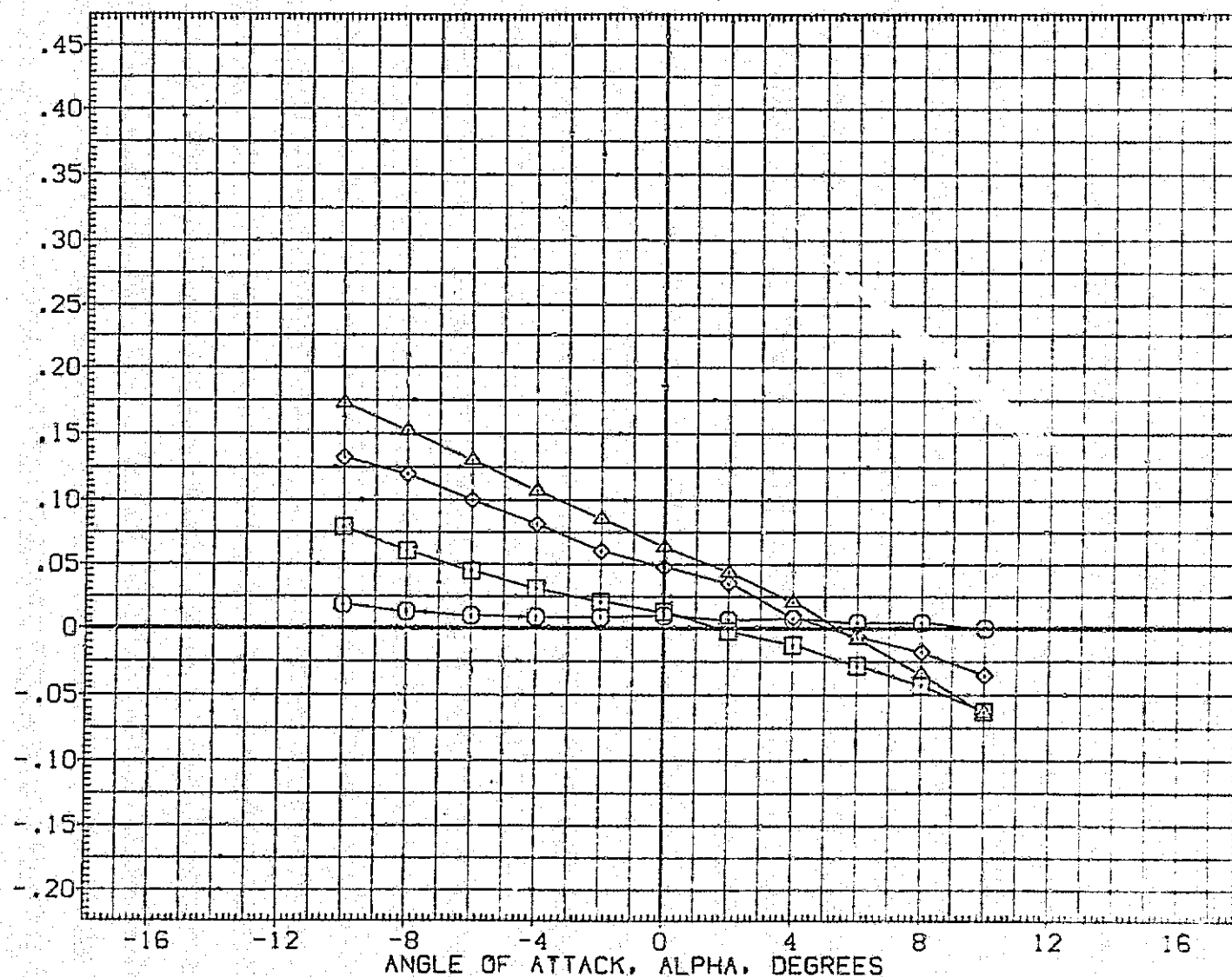


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (I)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(1A33) 740TS (TIP1)
(VIC004)	MSFC 594(1A33) 740TS (TIP1SIP2)
(VIC005)	MSFC 594(1A33) 740TS (TIP101)
(VIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	N. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

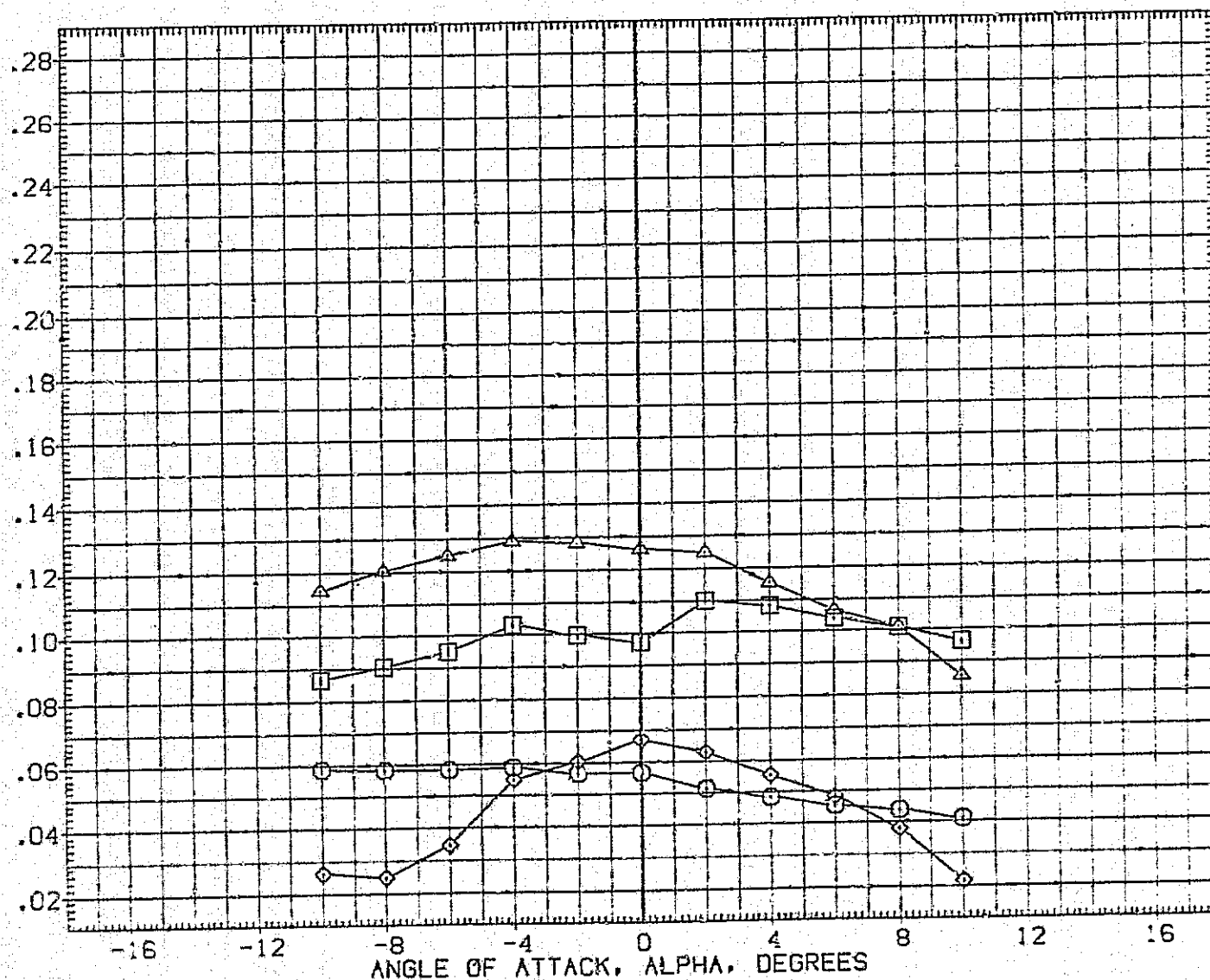


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	DATA NOT AVAILABLE
(VIC004)	DATA NOT AVAILABLE
(VIC005)	DATA NOT AVAILABLE
(VIC007)	MSFC S94(1A33) 740TS (TIP(SIP201))

ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1230.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

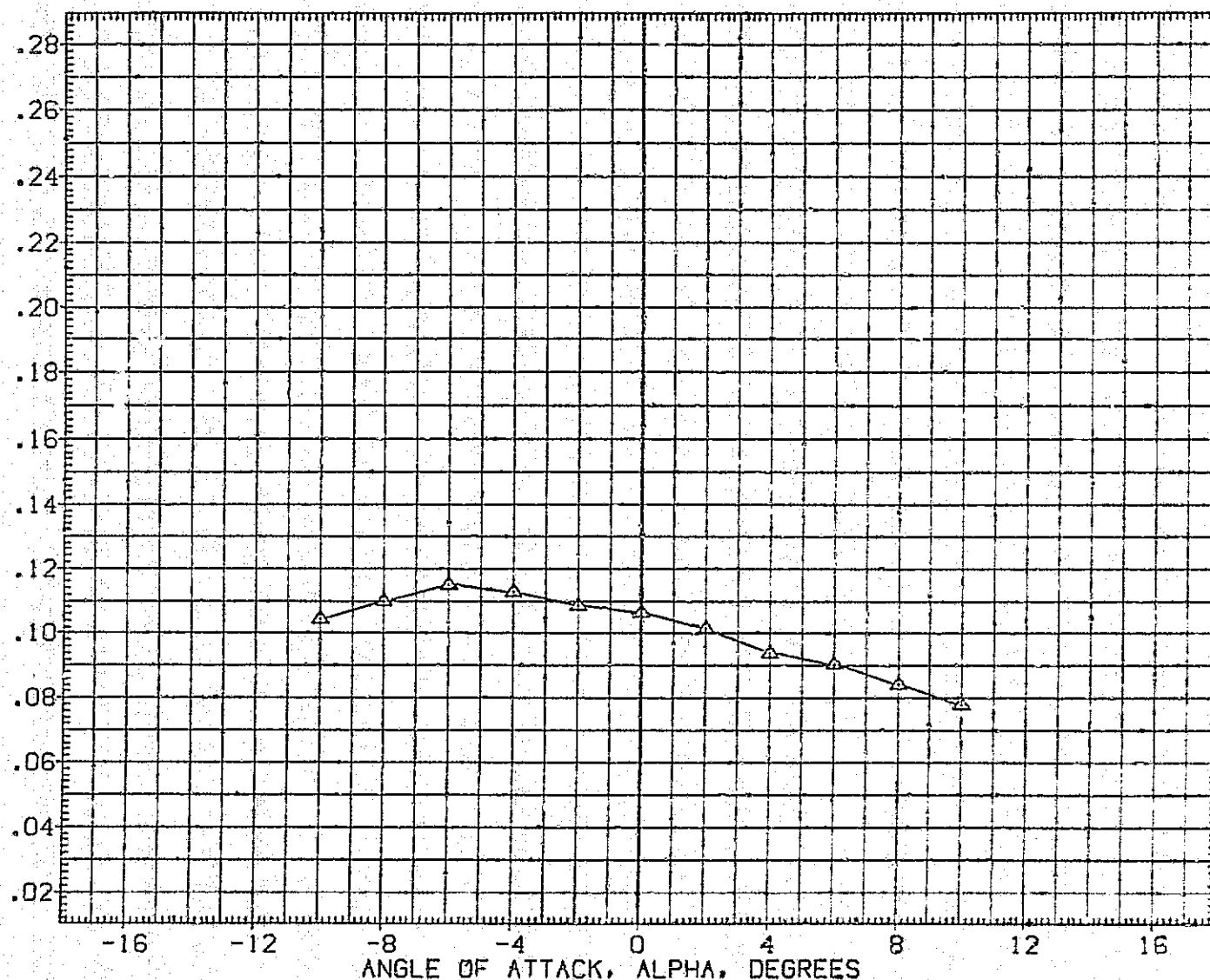


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(1A33) 740TS (TIP1)
(VIC004)	MSFC 594(1A33) 740TS (TIP1SIP2)
(VIC005)	MSFC 594(1A33) 740TS (TIP101)
(VIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

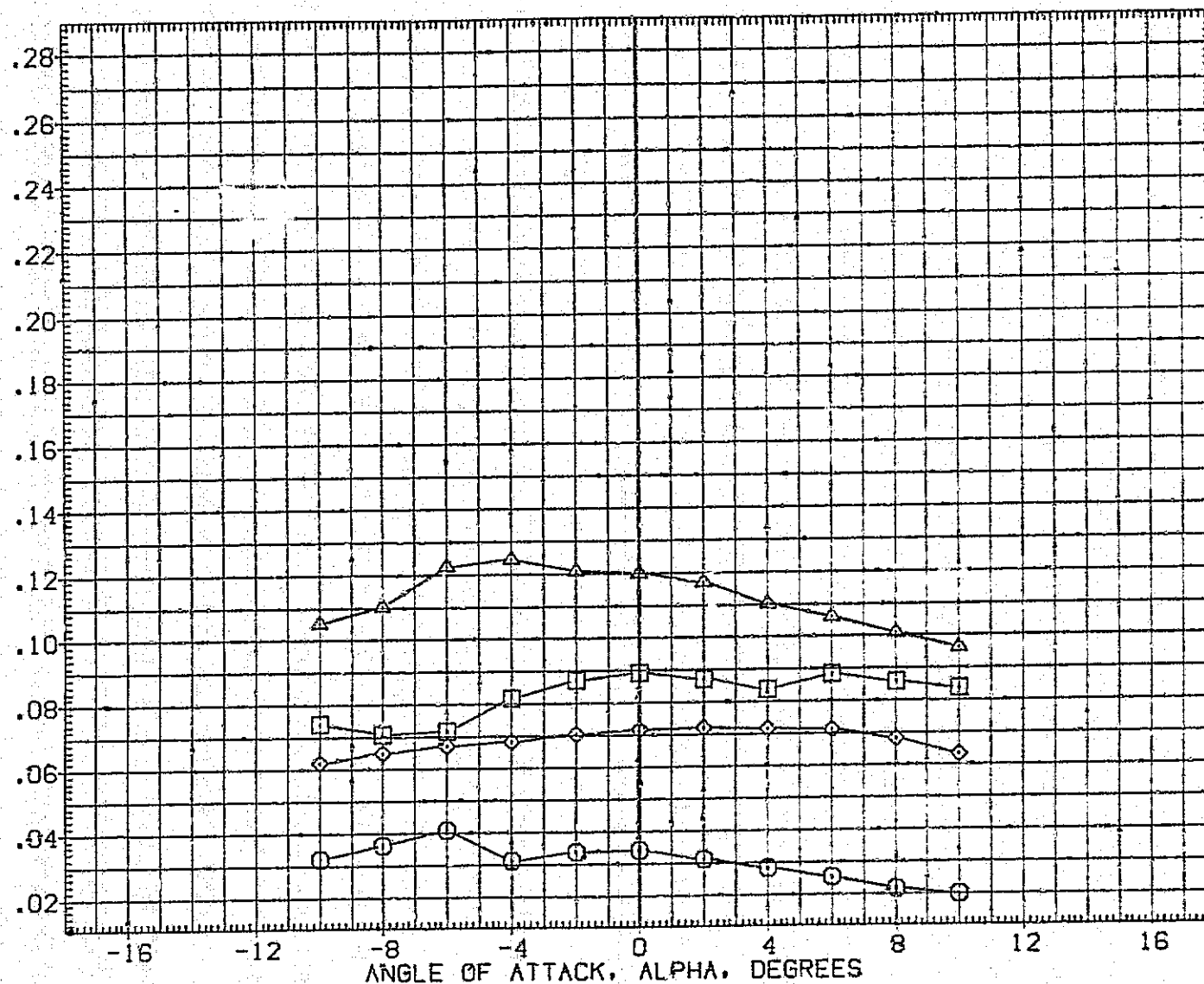


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(A33) 740TS (TIP1)
(VIC004)	MSFC 594(A33) 740TS (TIP1SIP2)
(VIC005)	MSFC 594(A33) 740TS (TIP101)
(VIC007)	MSFC 594(A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION	
SREF	2890.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

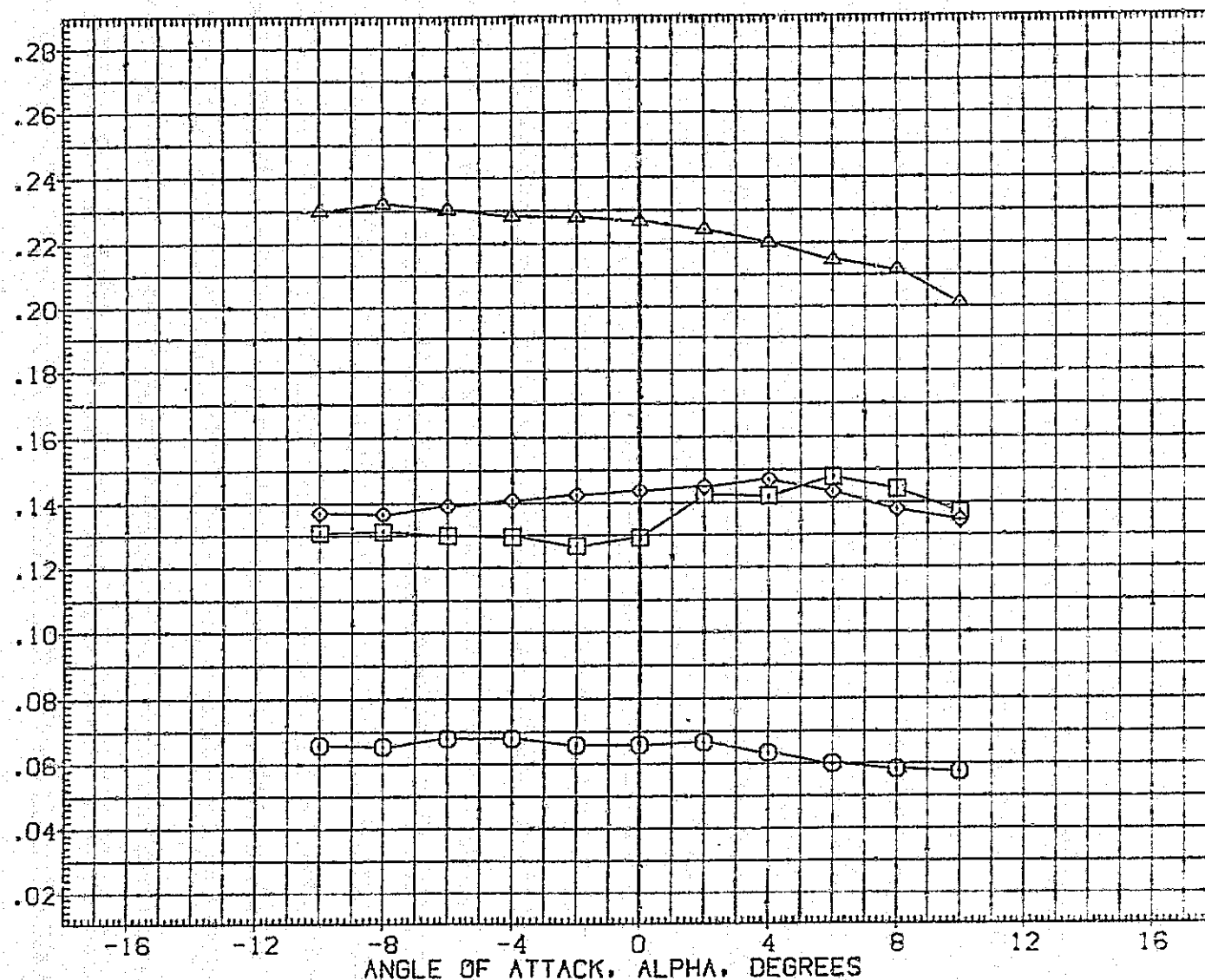


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (D)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(1A33) 740TS (TIP1)
(VIC004)	MSFC 594(1A33) 740TS (TIP1SIP2)
(VIC005)	MSFC 594(1A33) 740TS (TIP101)
(VIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2650.0000	50. FT
LREF	1280.0000	IN.
BREF	1280.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

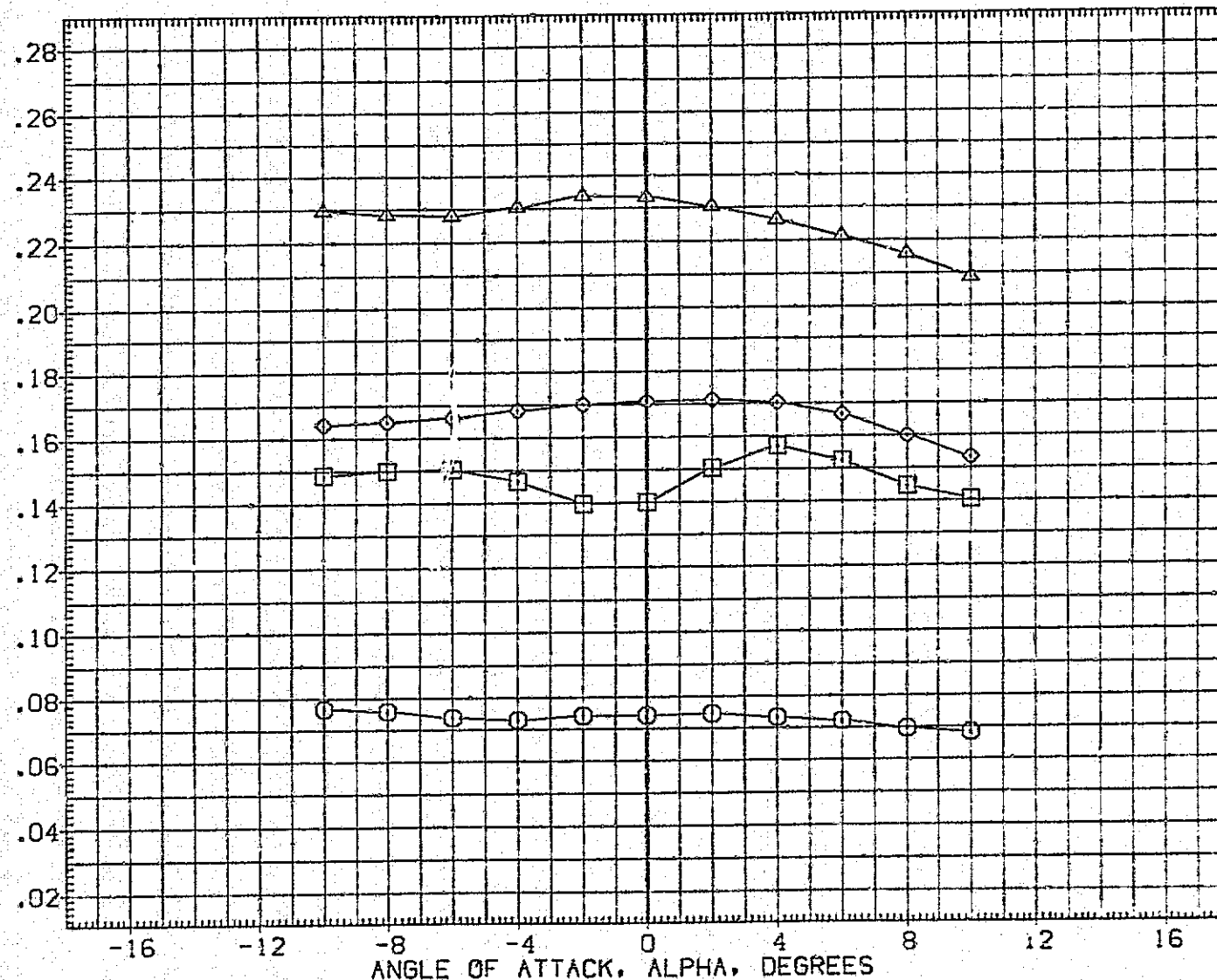


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (E)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	DATA NOT AVAILABLE
(VIC004)	DATA NOT AVAILABLE
(VIC005)	DATA NOT AVAILABLE
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

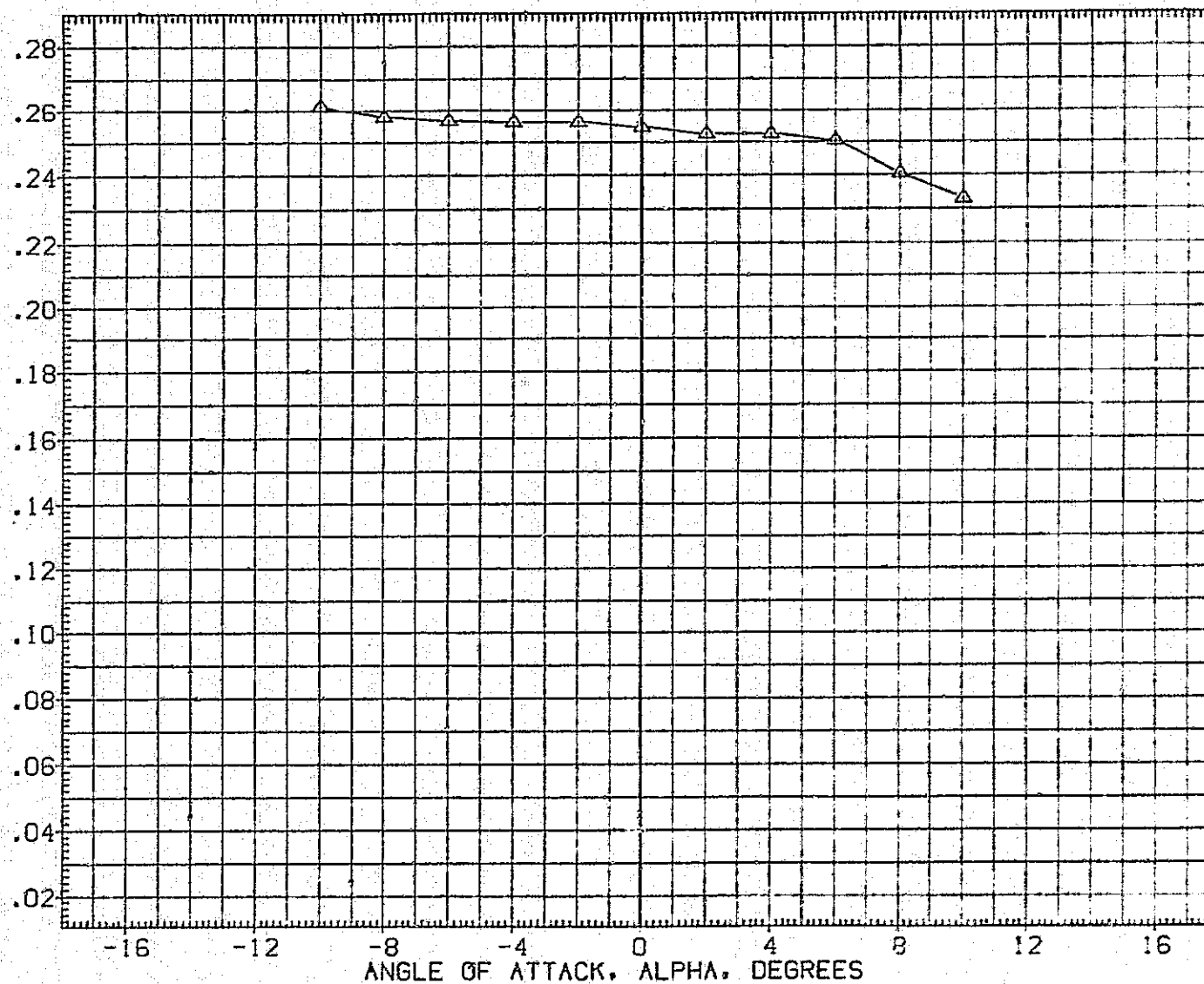


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(F)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(VIC001)	MSFC 594(A33) 740TS (TIP1)	ET STING
(VIC004)	MSFC 594(A33) 740TS (TIPISIP2)	ET STING
(VIC005)	MSFC 594(A33) 740TS (TIP101)	ORB STING
(VIC007)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

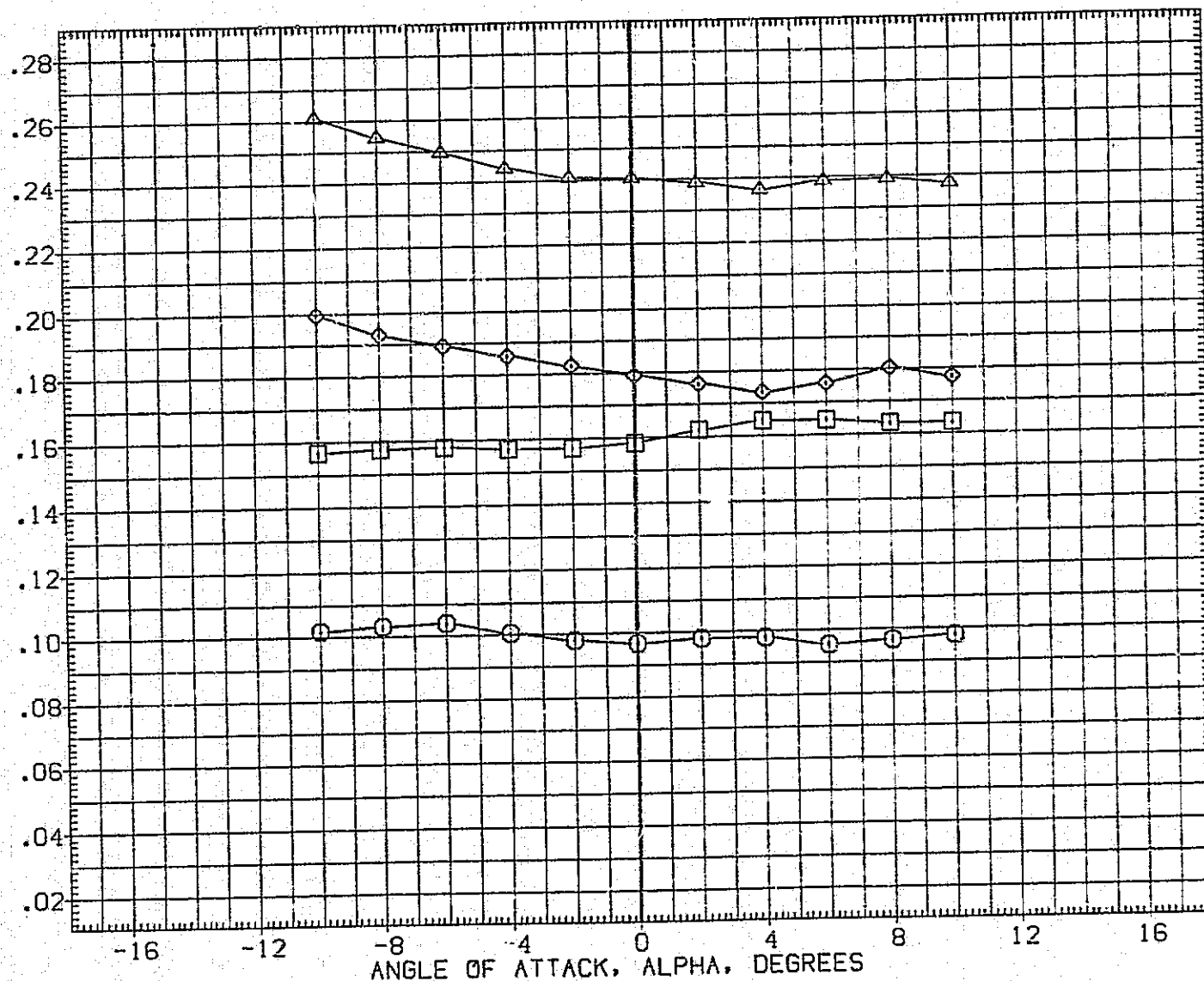


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(G)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(VIC001)	MSFC 594(1A33) 740TS (TIP1)	ET STING
(VIC004)	MSFC 594(1A33) 740TS (TIP1SIP2)	ET STING
(VIC005)	MSFC 594(1A33) 740TS (TIP101)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

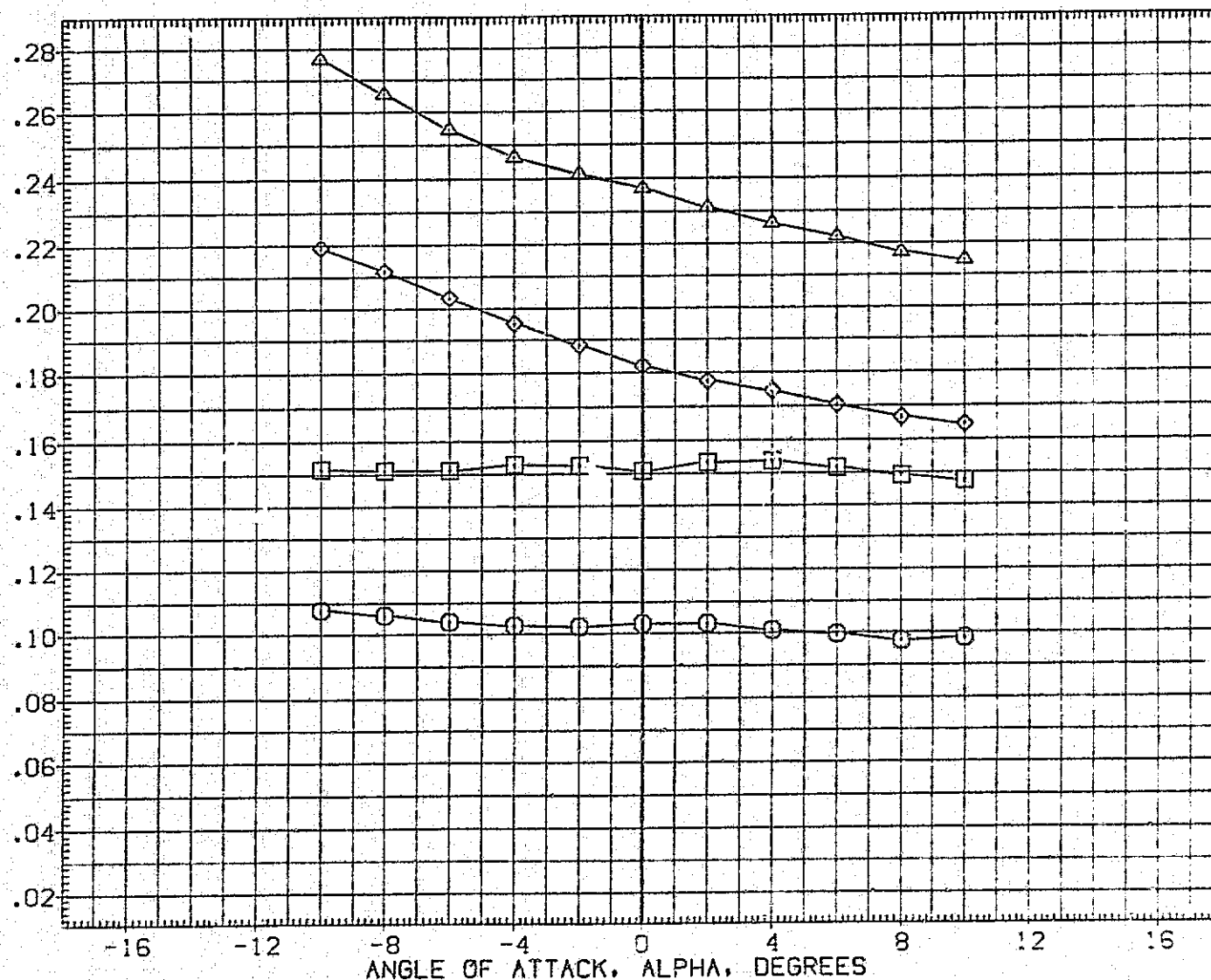


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, $\beta = 0$ DEG
 (H)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(A33) 740TS (TIP1)
(VIC004)	MSFC 594(A33) 740TS (TIP1SIP2)
(VIC005)	MSFC 594(A33) 740TS (TIP101)
(VIC007)	MSFC 594(A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRF	976.0000 IN. XT
YMRF	.0000 IN. YT
ZMRF	400.0000 IN. ZT
SCALE	.0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

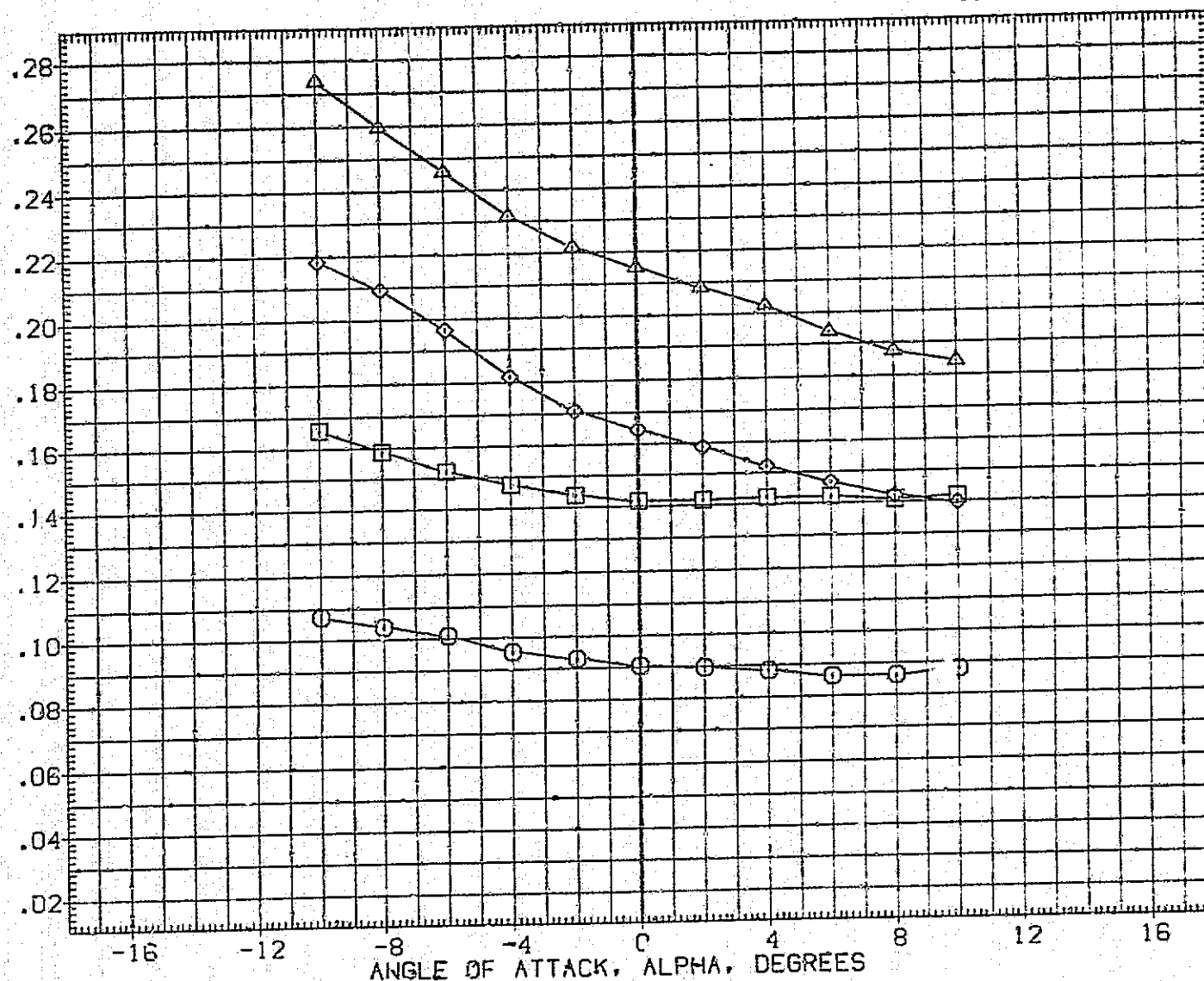


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (I)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(1A33) 740TS (T1P1)
(VIC004)	MSFC 594(1A33) 740TS (T1P1P2)
(VIC005)	MSFC 594(1A33) 740TS (T1P101)
(VIC007)	MSFC 594(1A33) 740TS (T1P1P201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

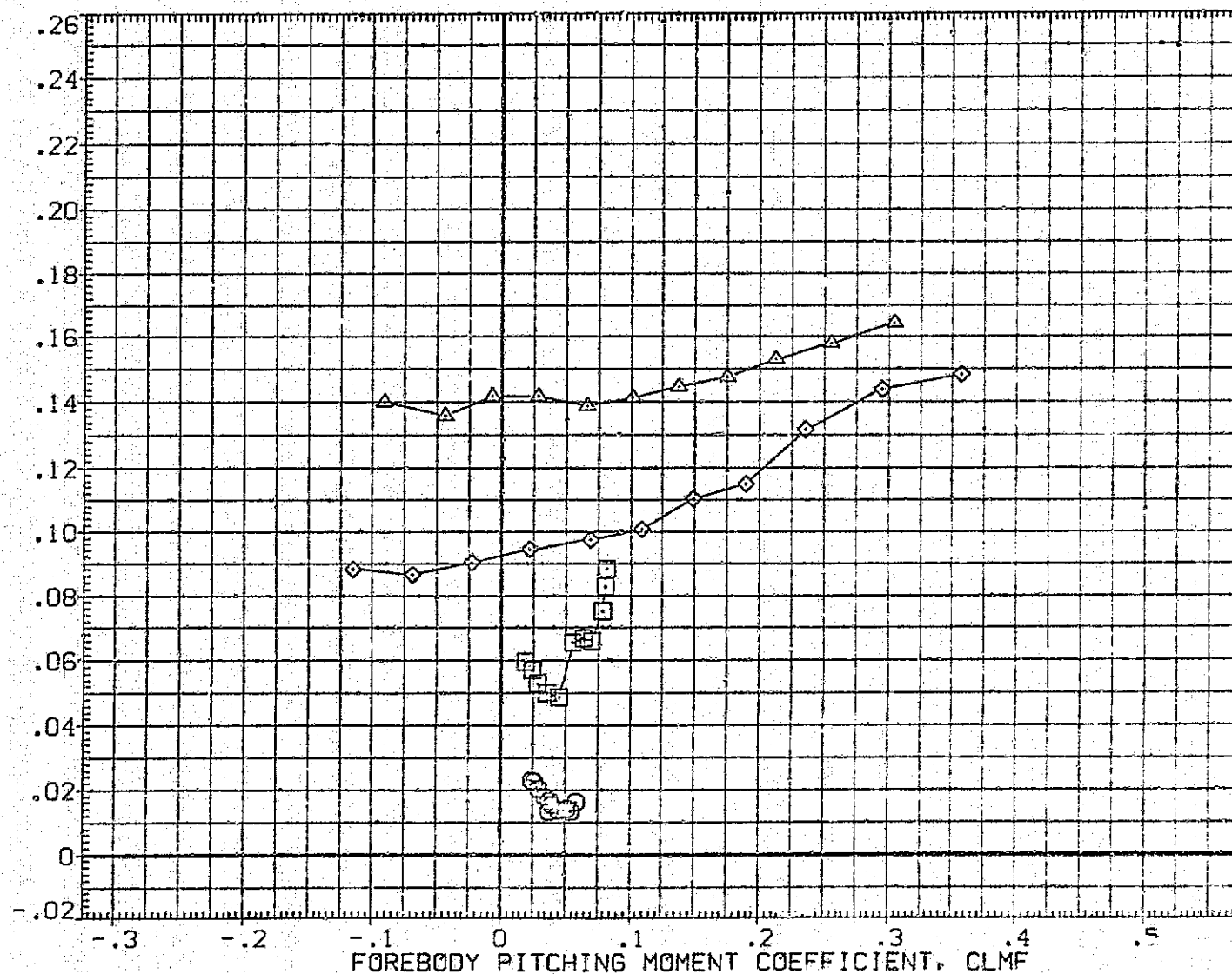


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001) ○	DATA NOT AVAILABLE
(VIC004) □	DATA NOT AVAILABLE
(VIC005) ◇	DATA NOT AVAILABLE
(VIC007) △	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

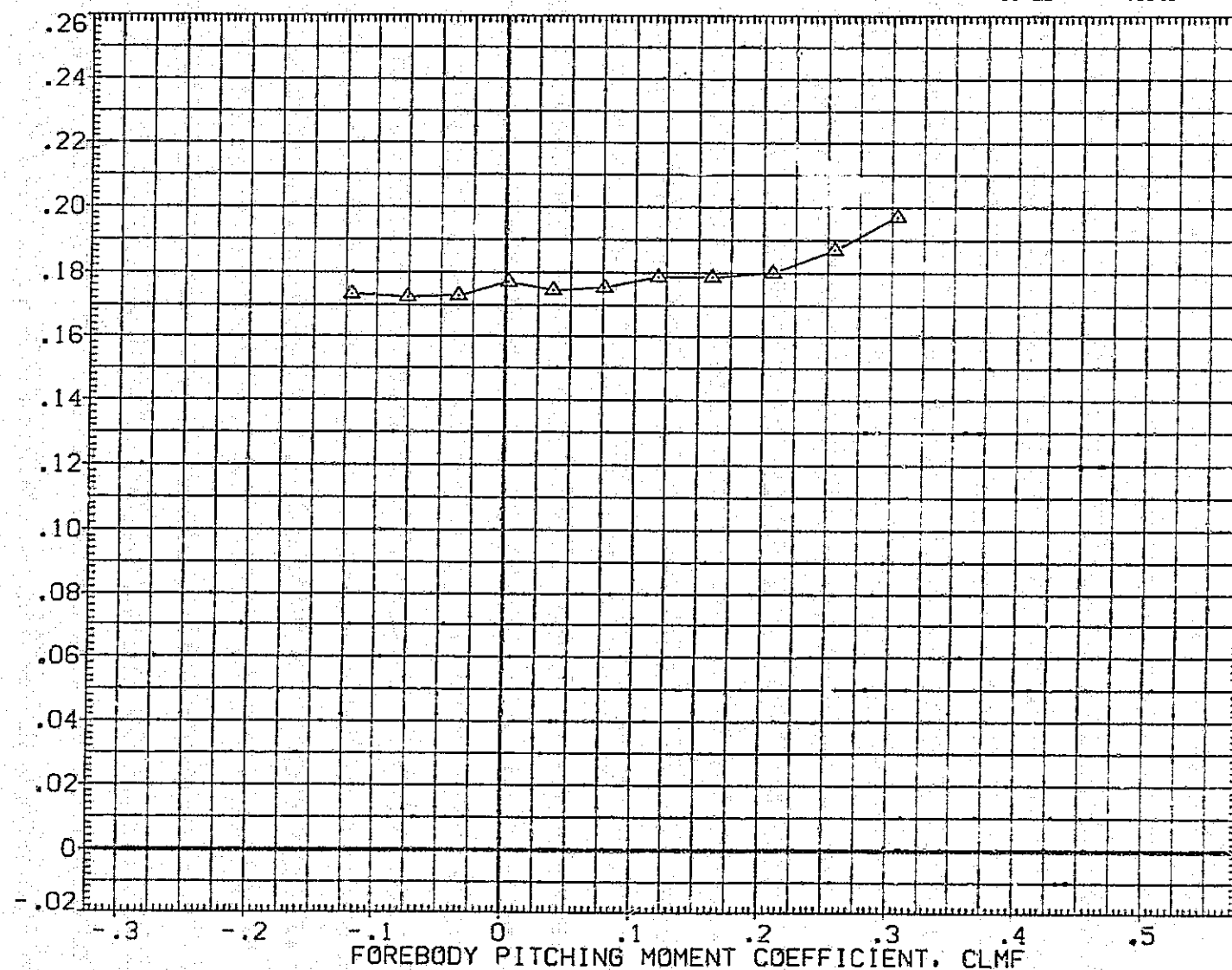


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(VIC001)	MSFC 594(IA33) 740TS (TIP1)	ET STING
(VIC004)	MSFC 594(IA33) 740TS (TIP1SIP2)	ET STING
(VIC005)	MSFC 594(IA33) 740TS (TIP101)	ORB STING
(VIC007)	MSFC 594(IA33) 740TS (TIP1SIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2890.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

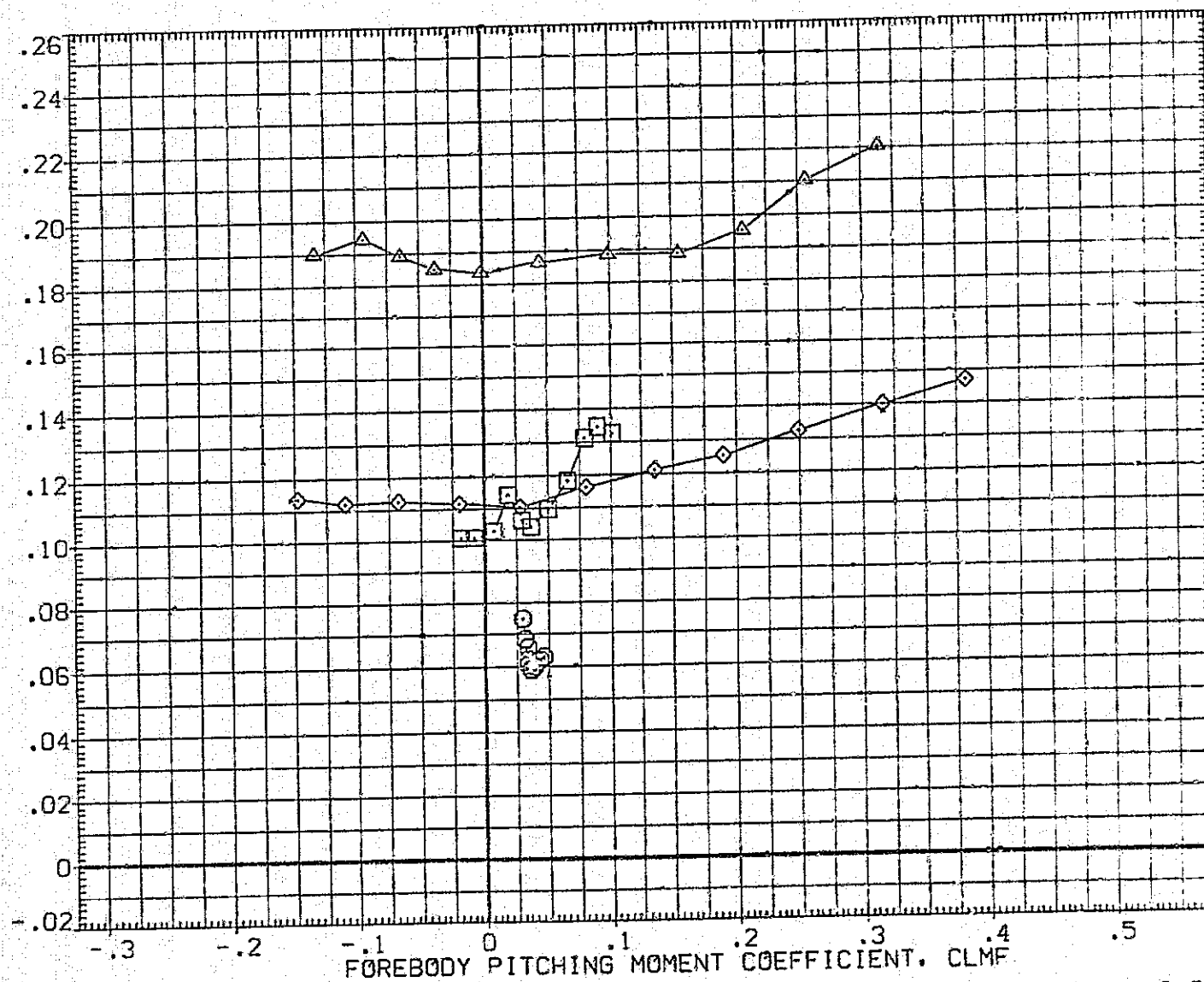


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(A33) 740TS (TIP1)
(VIC004)	MSFC 594(A33) 740TS (TIP1SIP2)
(VIC005)	MSFC 594(A33) 740TS (TIP101)
(VIC007)	MSFC 594(A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION

SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1280.0000	IN.
YMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

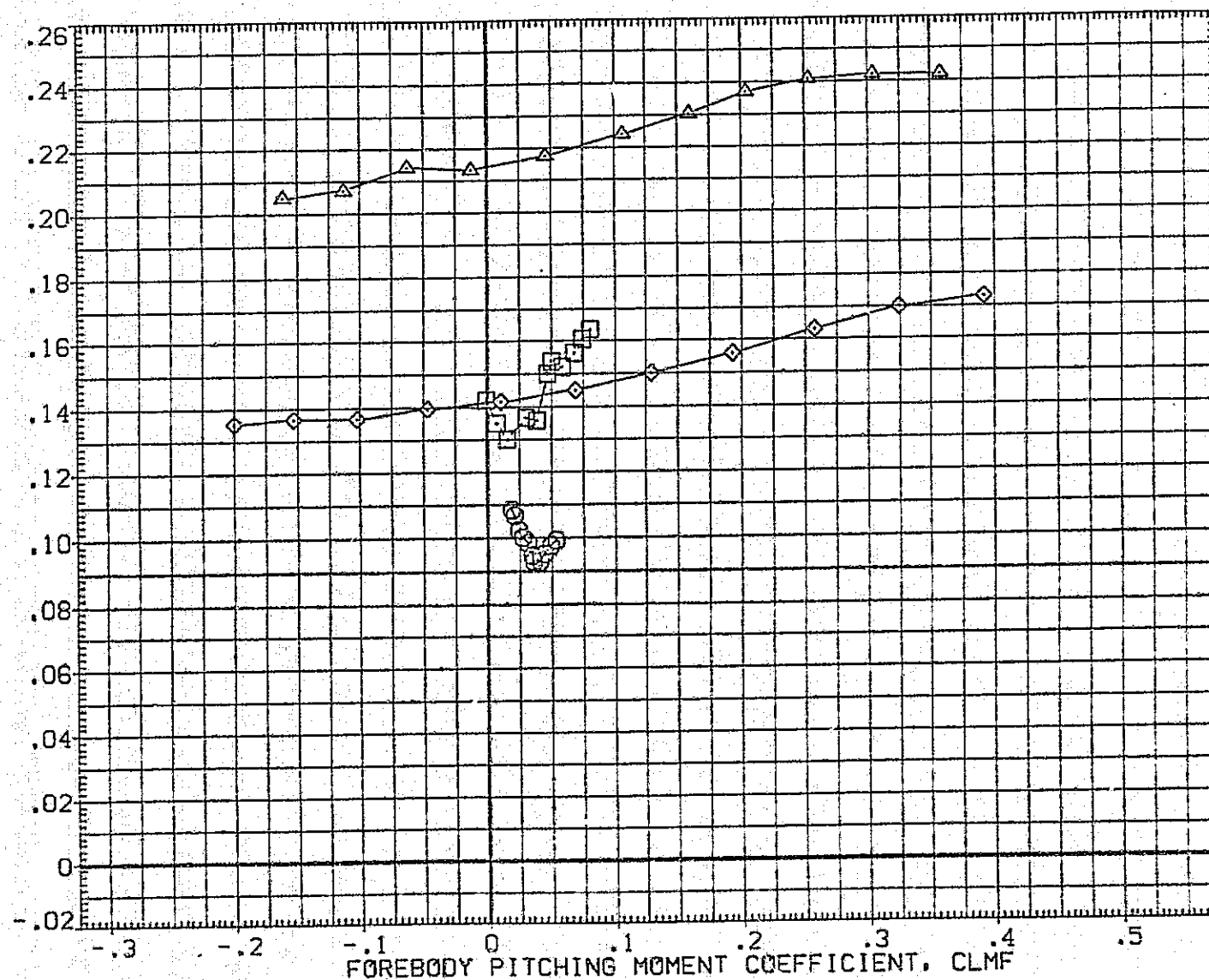


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(D)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(1A33) 740TS (TIP1)
(VIC004)	MSFC 594(1A33) 740TS (TIP1SIP2)
(VIC005)	MSFC 594(1A33) 740TS (TIP101)
(VIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

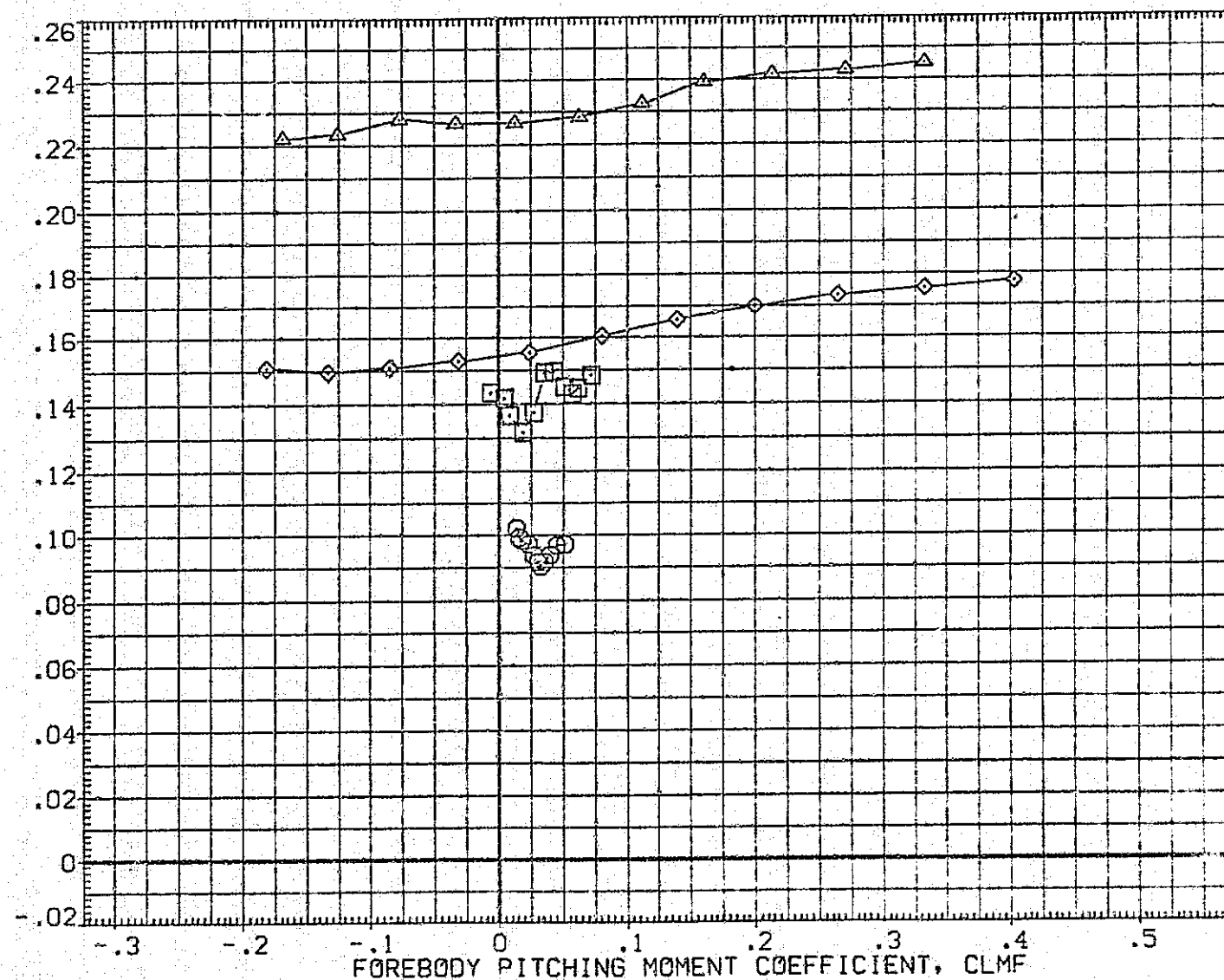


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(E)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	DATA NOT AVAILABLE
(VIC004)	DATA NOT AVAILABLE
(VIC005)	DATA NOT AVAILABLE
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

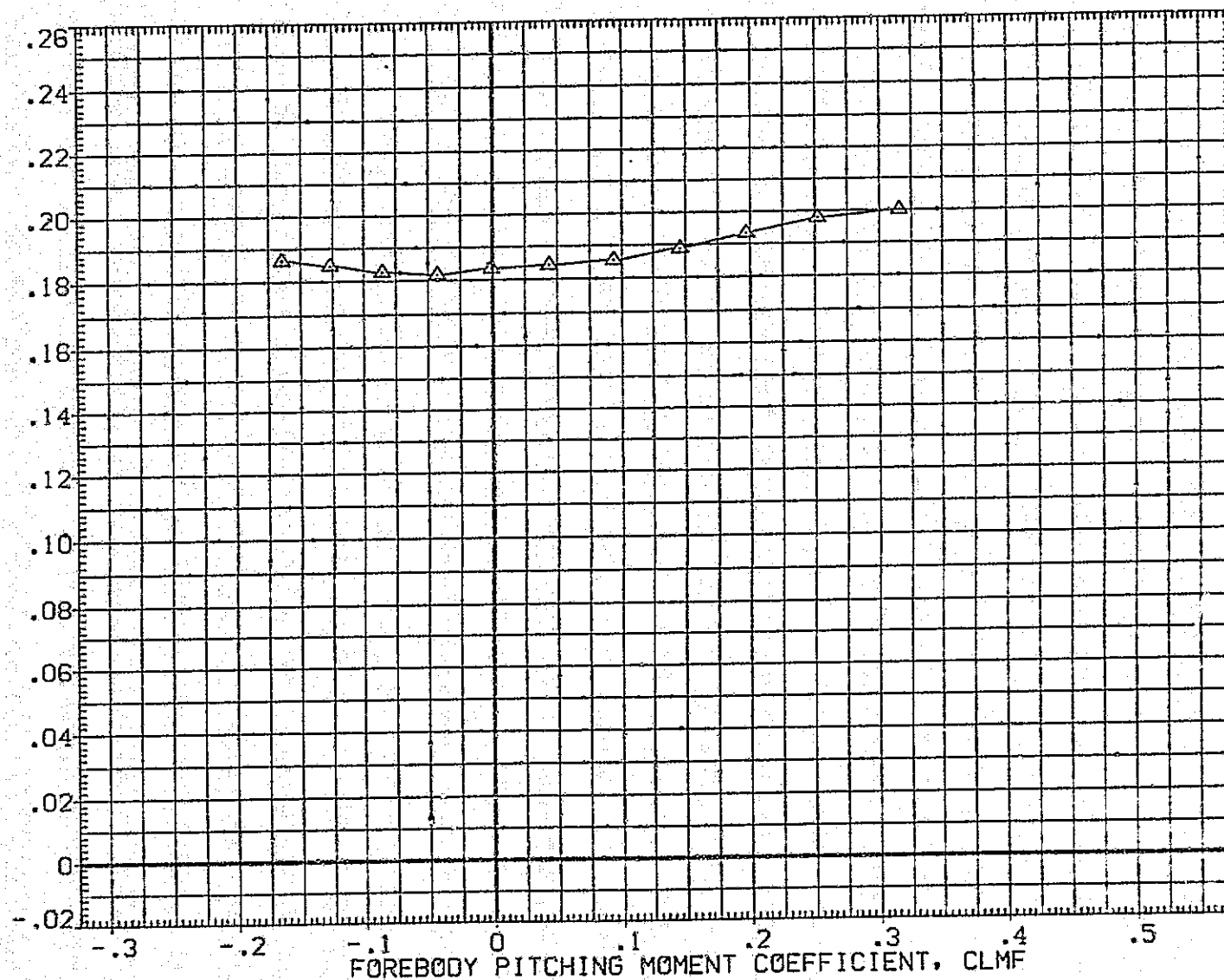


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(F)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
[VIC001]	MSFC 594(1A33) 740TS (TIP1)	ET STING
[VIC004]	MSFC 594(1A33) 740TS (TIPISIP2)	ET STING
[VIC005]	MSFC 594(1A33) 740TS (TIP01)	ORB STING
[VIC007]	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	576.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

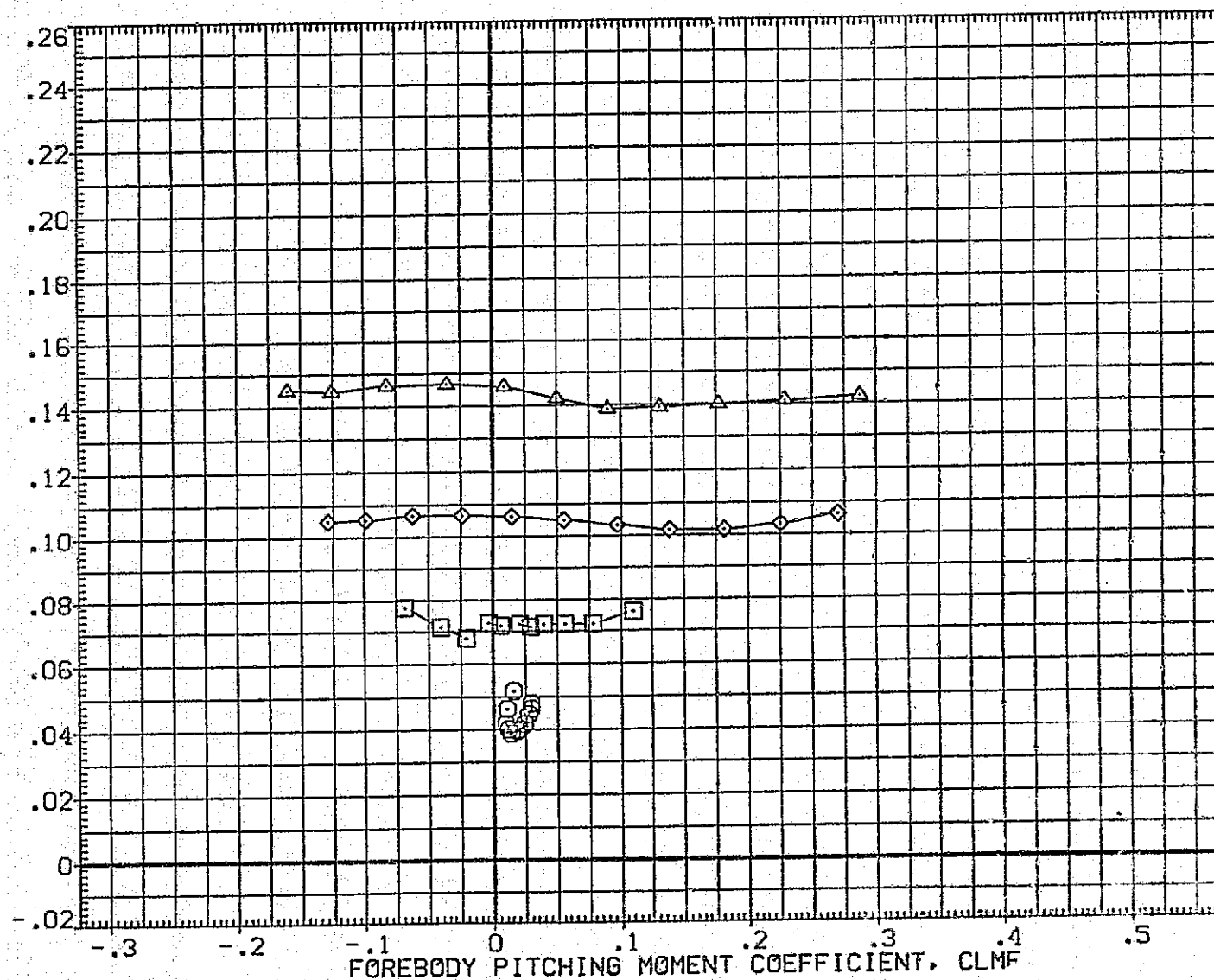


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(G)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(1A33) 740TS (TIP1)
(VIC004)	MSFC 594(1A33) 740TS (TIP1SIP2)
(VIC005)	MSFC 594(1A33) 740TS (TIP101)
(VIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

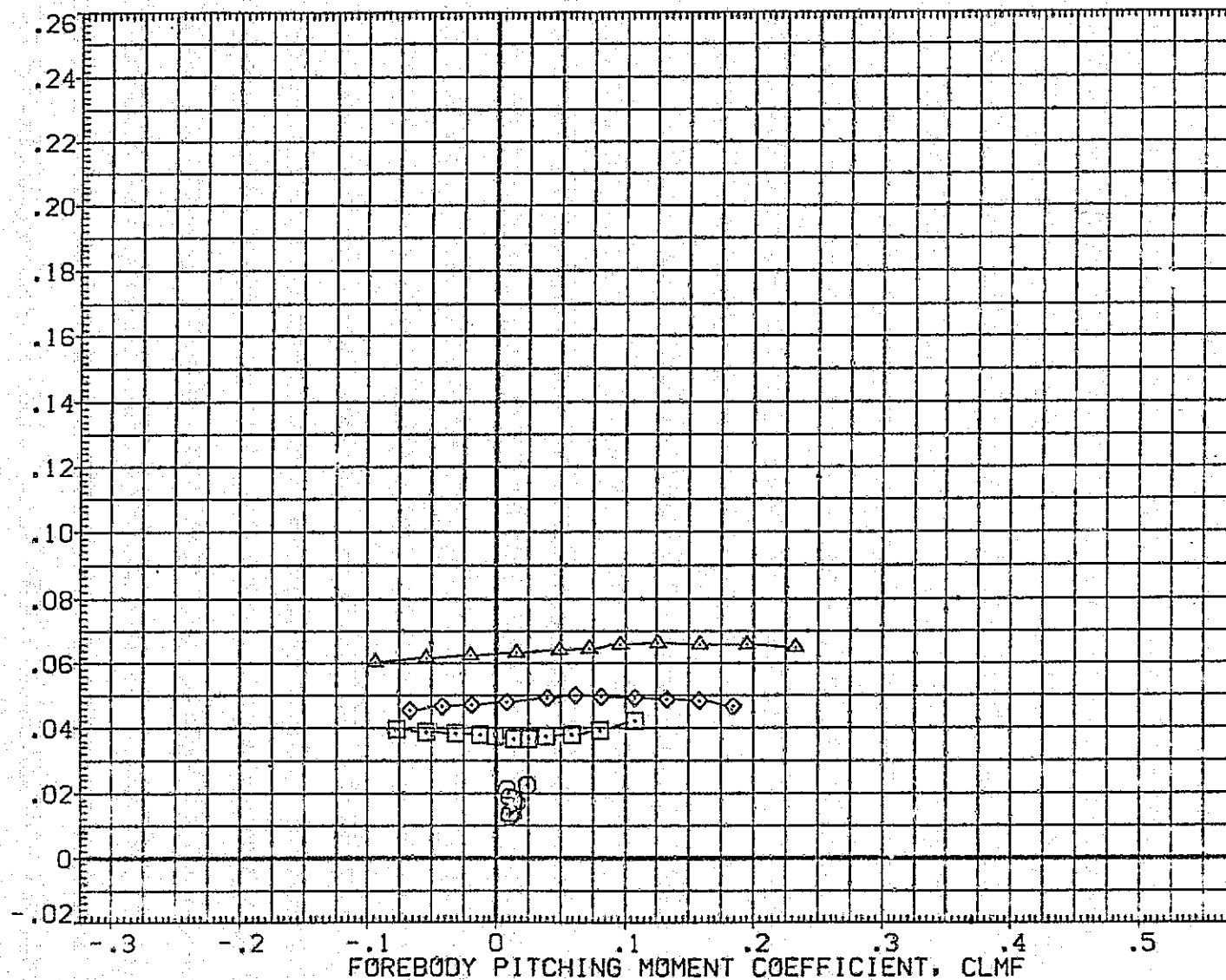


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(H)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(1A33) 740TS (TIP1)
(VIC004)	MSFC 594(1A33) 740TS (TIP1P2)
(VIC005)	MSFC 594(1A33) 740TS (TIP101)
(VIC007)	MSFC 594(1A33) 740TS (TIP1P201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

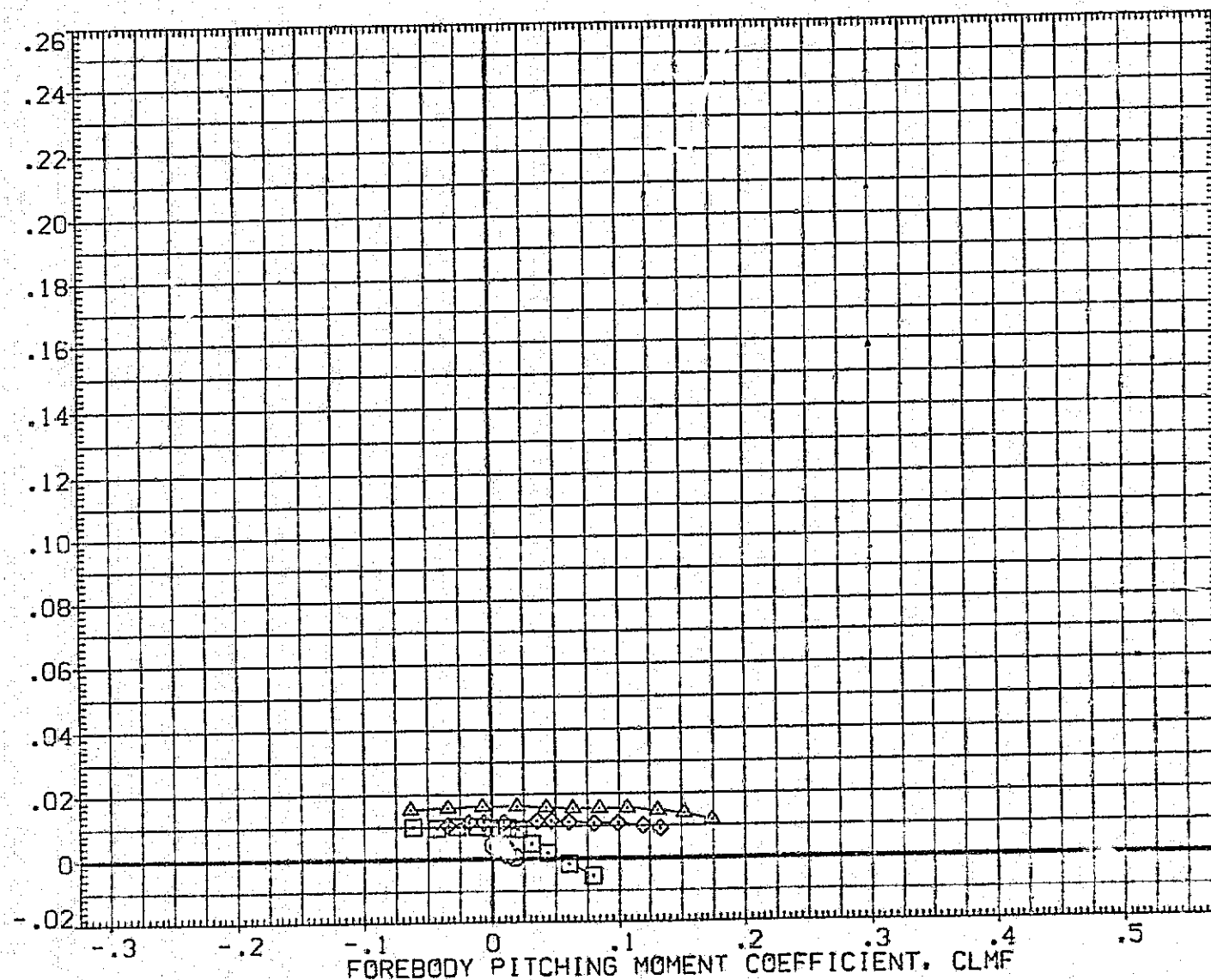


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (1)MACH - 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(VIC001)	MSFC 594 (A33) 740TS (TIP1)	ET STING
(VIC004)	MSFC 594 (A33) 740TS (TIP1SIP2)	ET STING
(VIC005)	MSFC 594 (A33) 740TS (TIP101)	ORB STING
(VIC007)	MSFC 594 (A33) 740TS (TIP1SIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

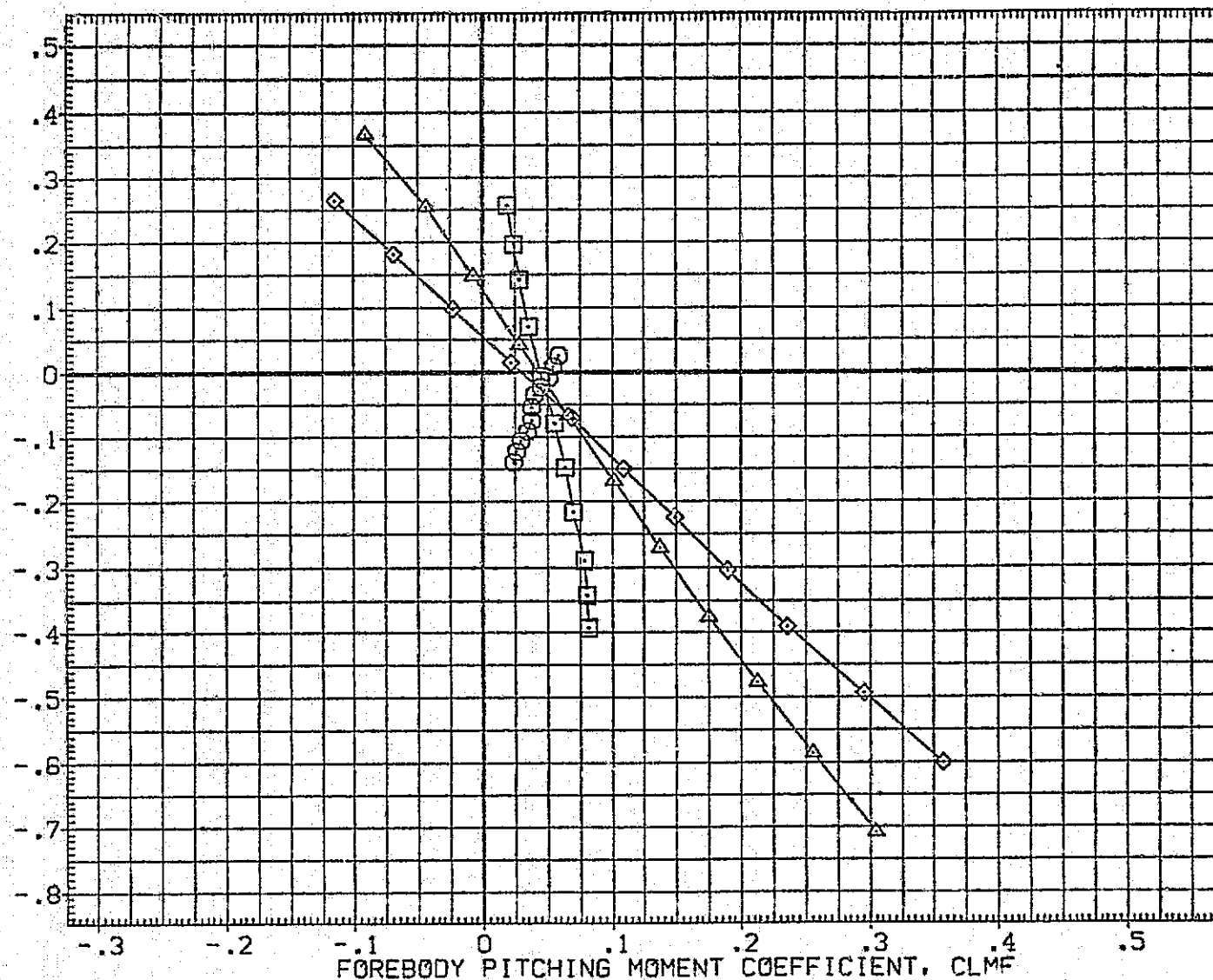


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (A) MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	DATA NOT AVAILABLE
(VIC004)	DATA NOT AVAILABLE
(VIC005)	DATA NOT AVAILABLE
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)

ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

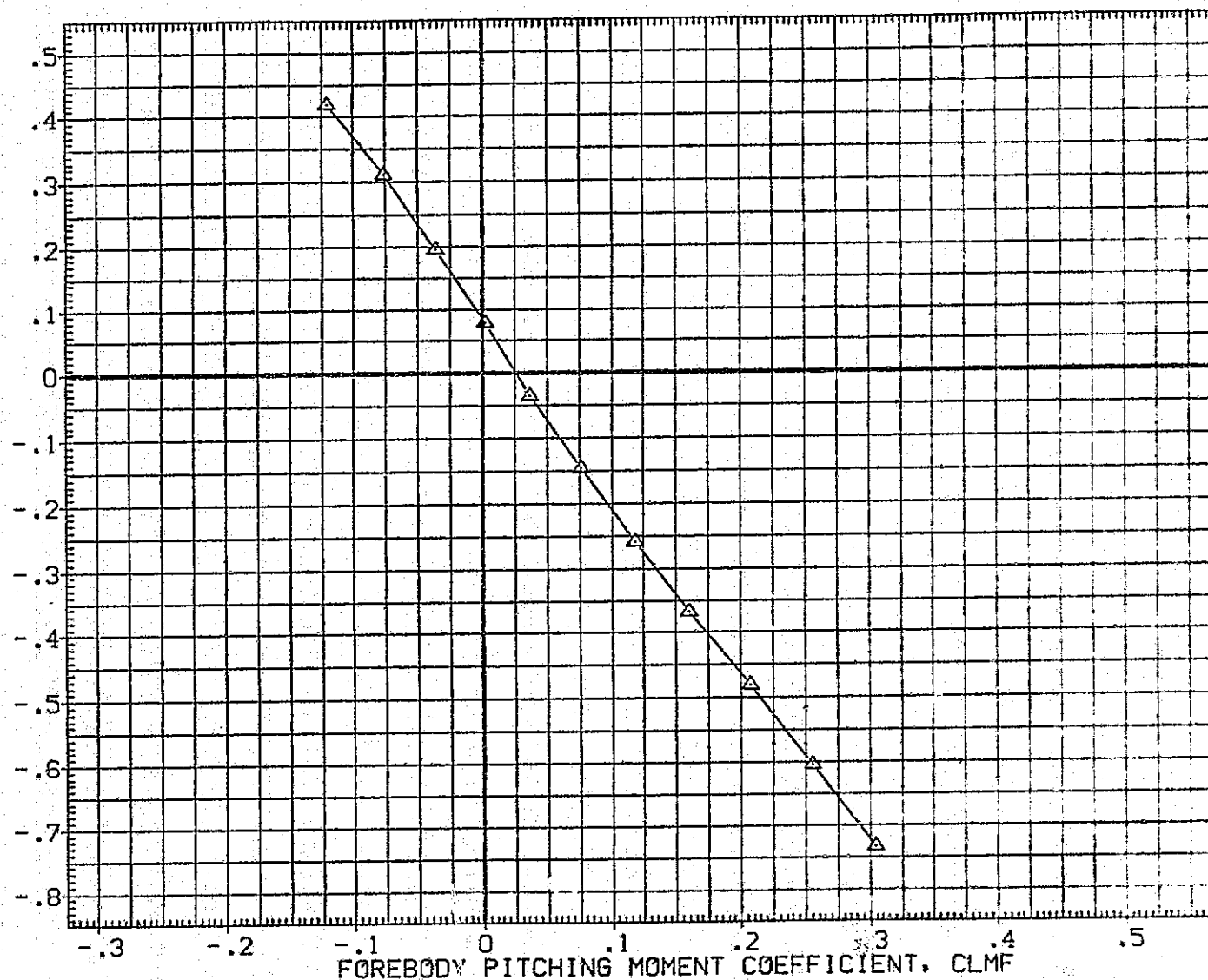


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(A33) 740TS (TIP1)
(VIC004)	MSFC 594(A33) 740TS (TIP1SIP2)
(VIC005)	MSFC 594(A33) 740TS (TIP101)
(VIC007)	MSFC 594(A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

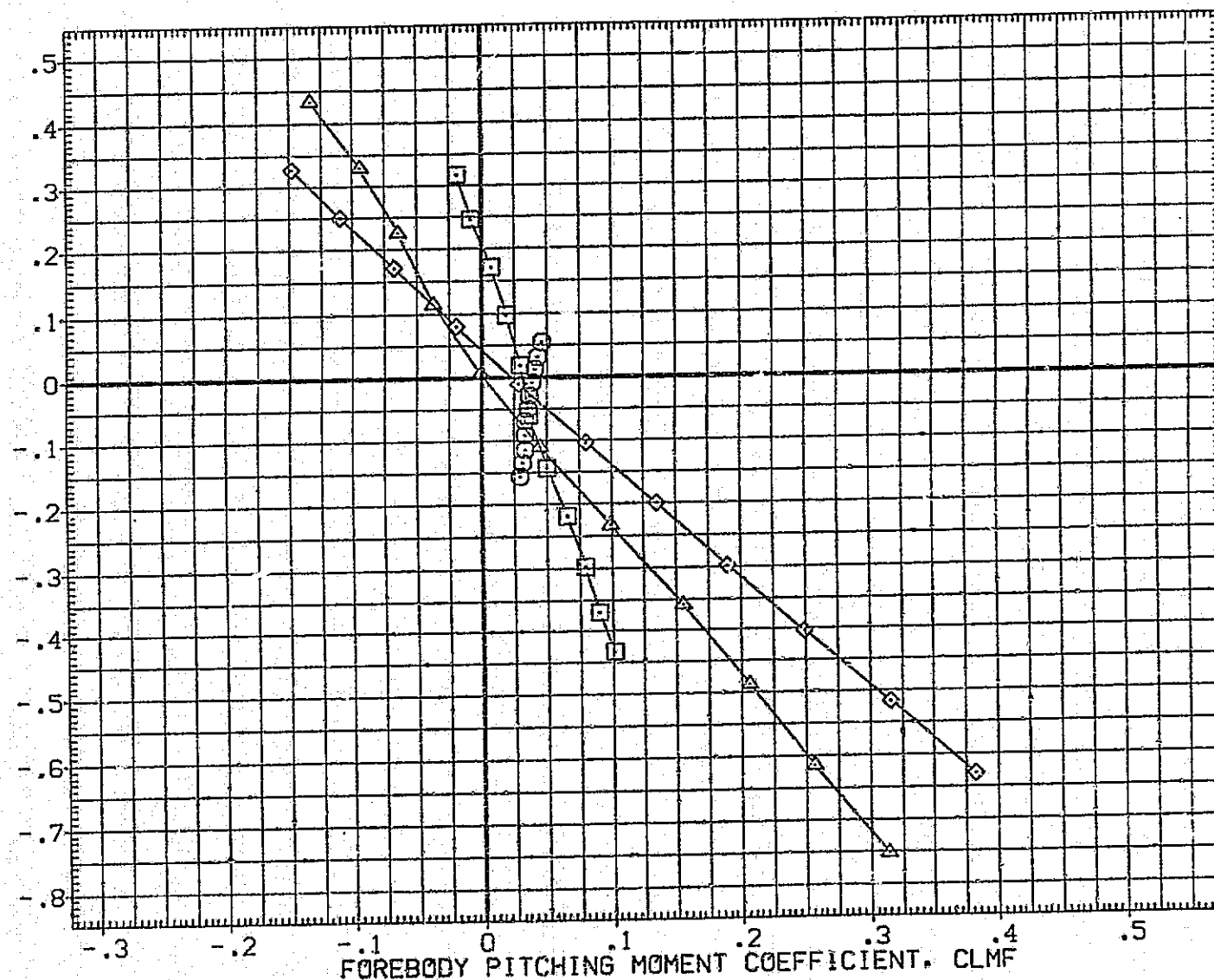


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(1A33) 740TS (TIP1)
(VIC004)	MSFC 594(1A33) 740TS (TIPISIP2)
(VIC005)	MSFC 594(1A33) 740TS (TIPID1)
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SD. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

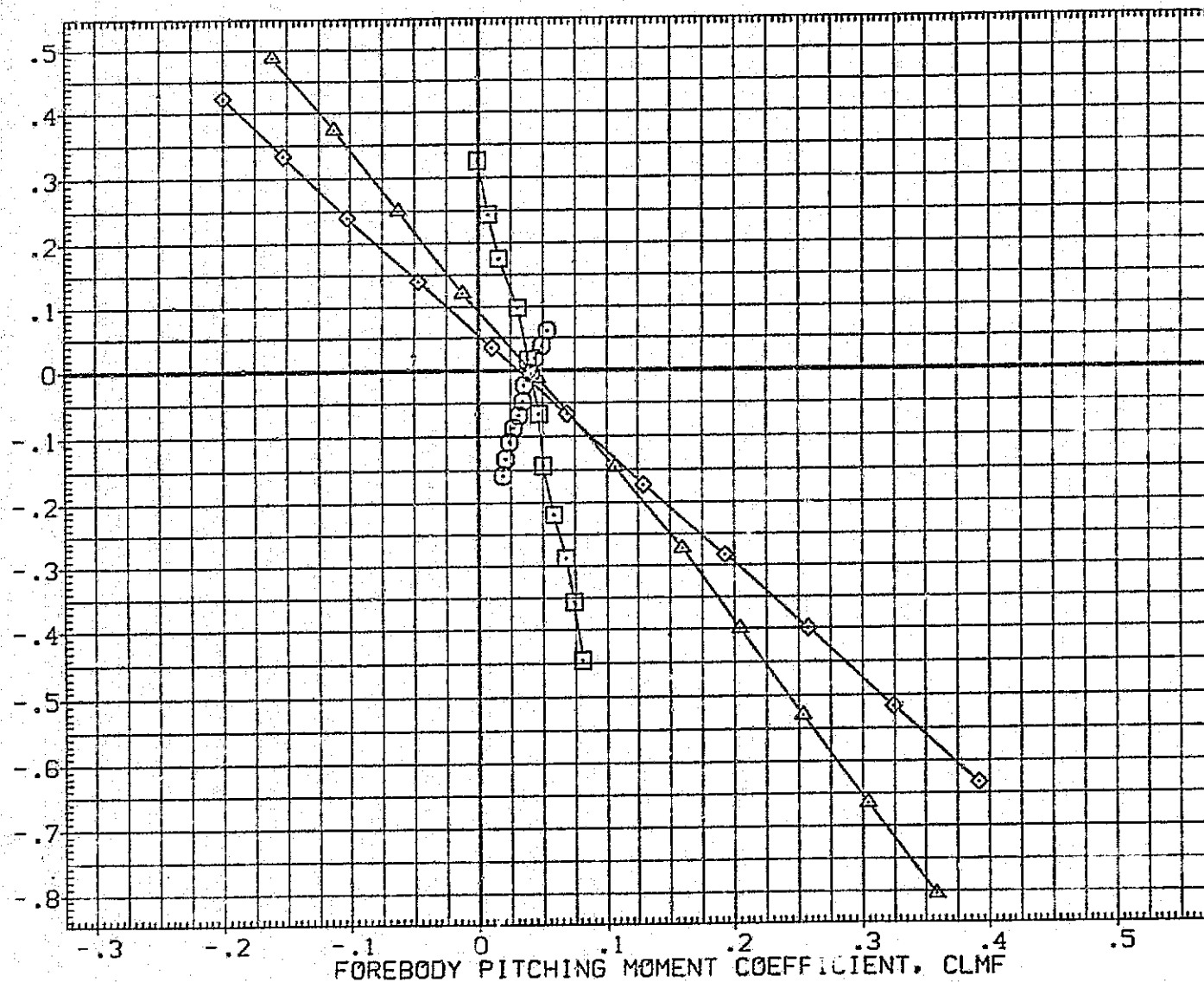


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (D)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 94(IA33) 740TS (TIP1)
(VIC004)	MSFC 94(IA33) 740TS (TIP1SIP2)
(VIC005)	MSFC 94(IA33) 740TS (TIP1D1)
(VIC007)	MSFC 94(IA33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

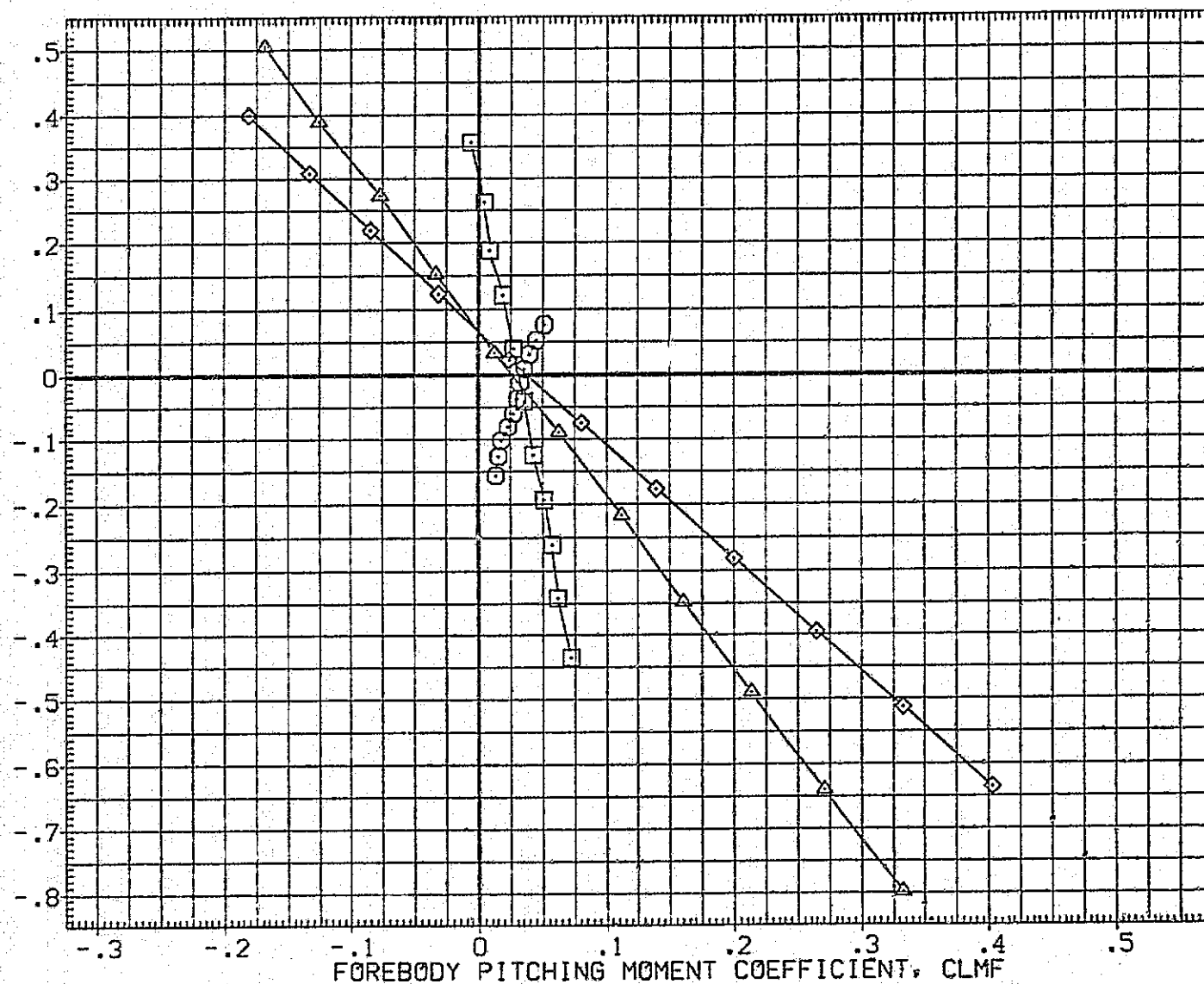


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(E)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	DATA NOT AVAILABLE
(VIC004)	DATA NOT AVAILABLE
(VIC005)	DATA NOT AVAILABLE
(VIC007)	MSFC 594 (JA33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. YT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

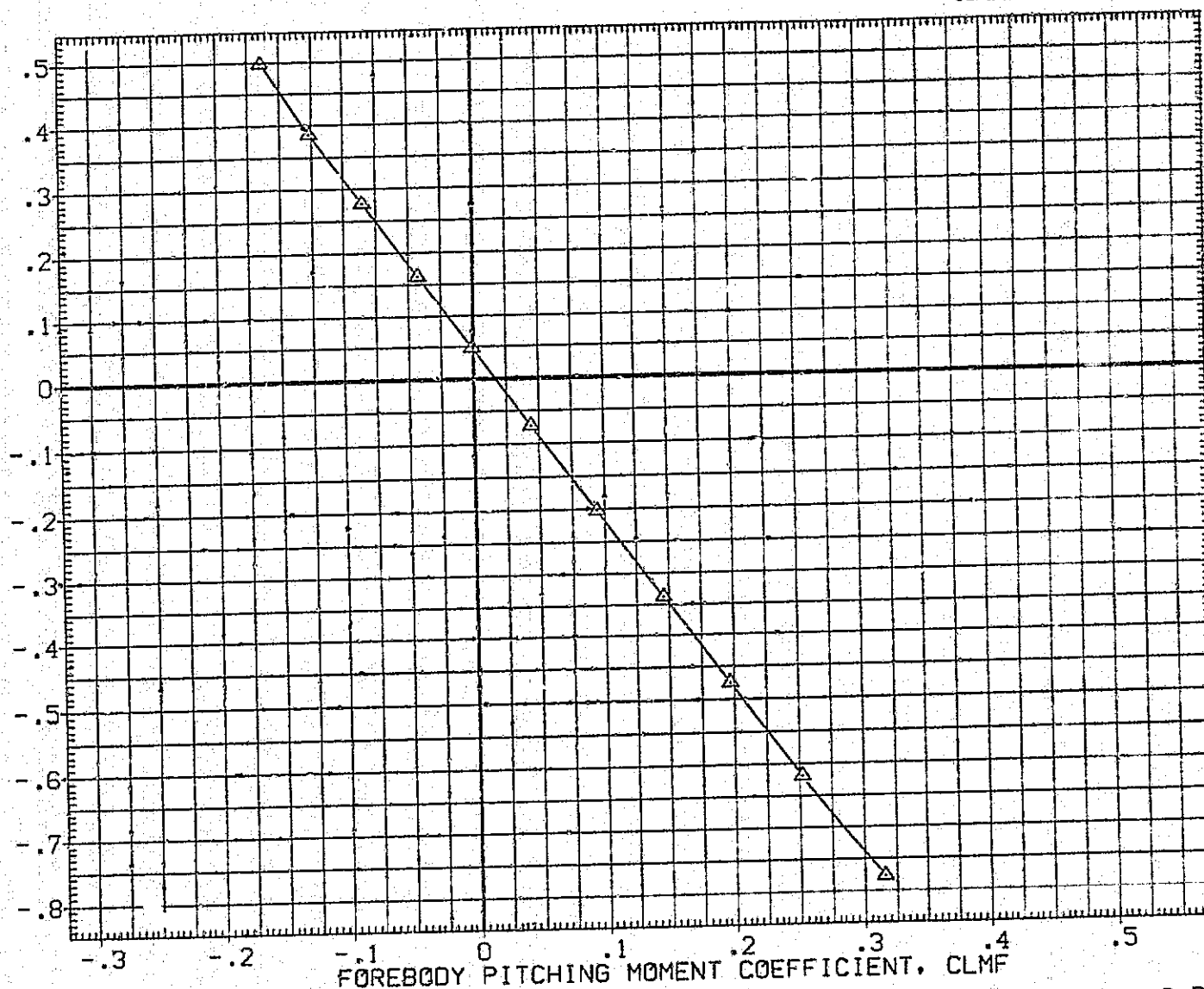


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(F)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(1A33) 740TS (TIP1)
(VIC004)	MSFC 594(1A33) 740TS (TIP1SIP2)
(VIC005)	MSFC 594(1A33) 740TS (TIP101)
(VIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

NORMAL FORCE COEFFICIENT, CN

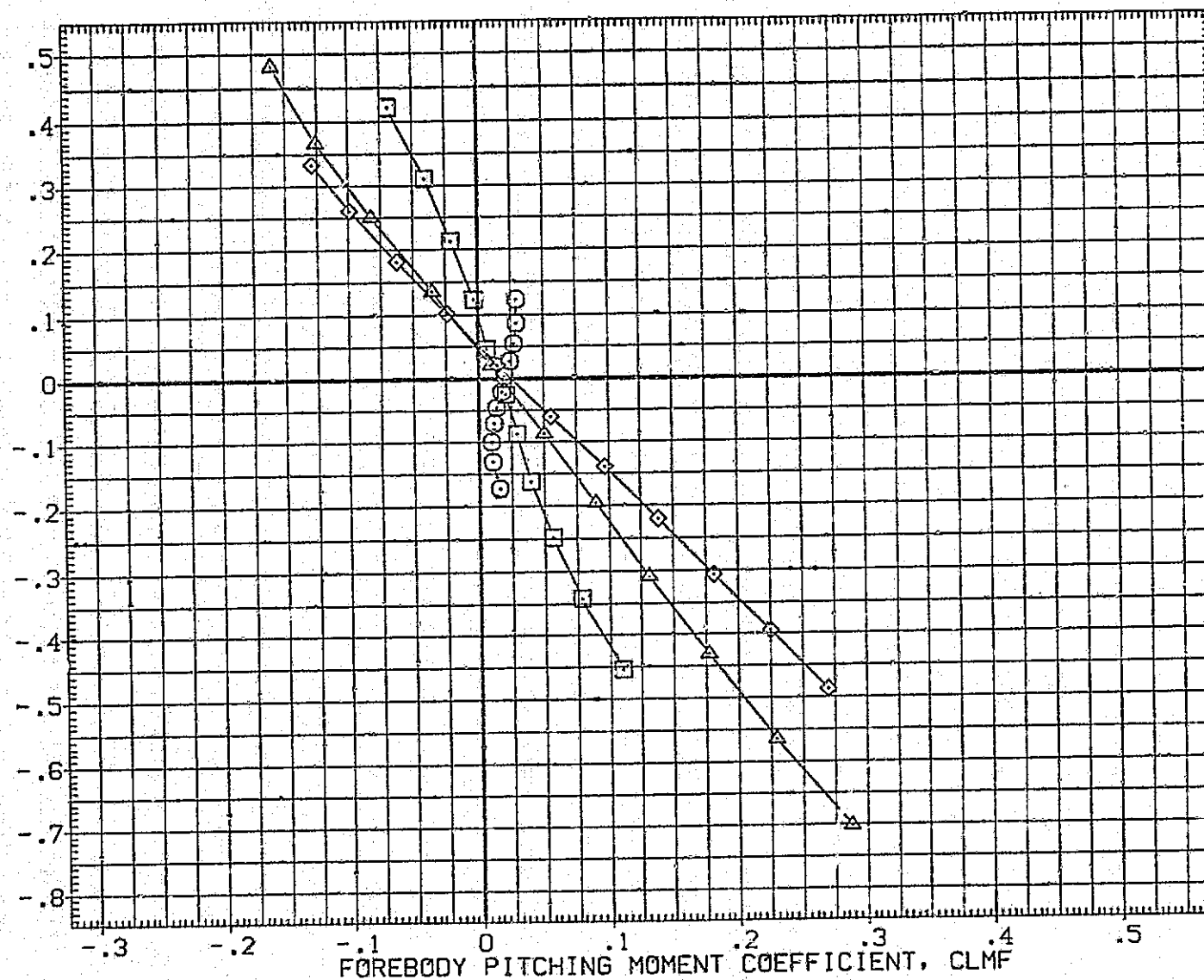


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(G)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC001)	MSFC 594(A33) 740TS (TIP1)
(VIC004)	MSFC 594(A33) 740TS (TIP1SIP2)
(VIC005)	MSFC 594(A33) 740TS (TIP101)
(VIC007)	MSFC 594(A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
YMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

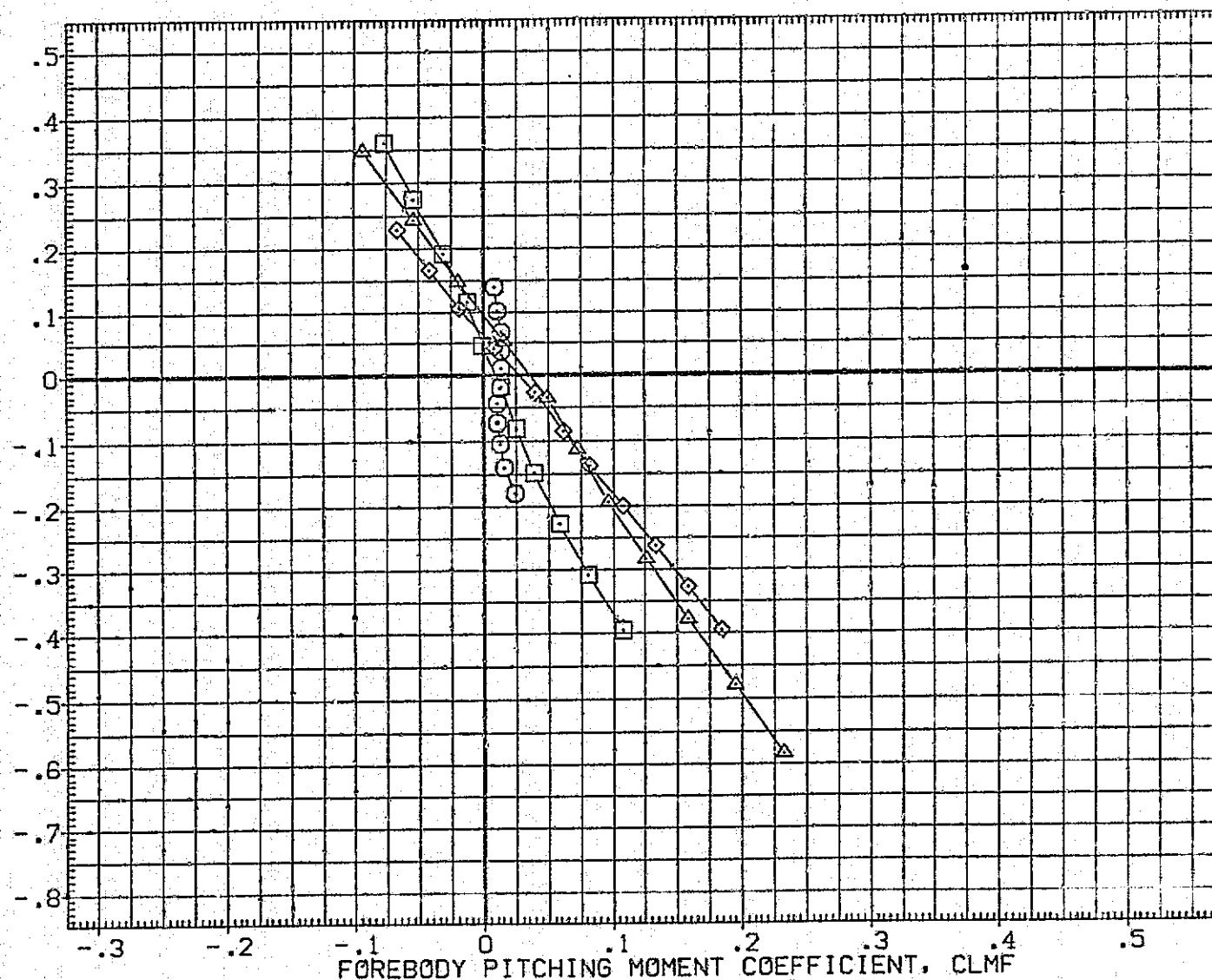


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(H)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(VIC001)	MSFC 594(1A33) 740TS (TIP1)	ET STING
(VIC004)	MSFC 594(1A33) 740TS (TIPISIP2)	ET STING
(VIC005)	MSFC 594(1A33) 740TS (TIP101)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	576.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

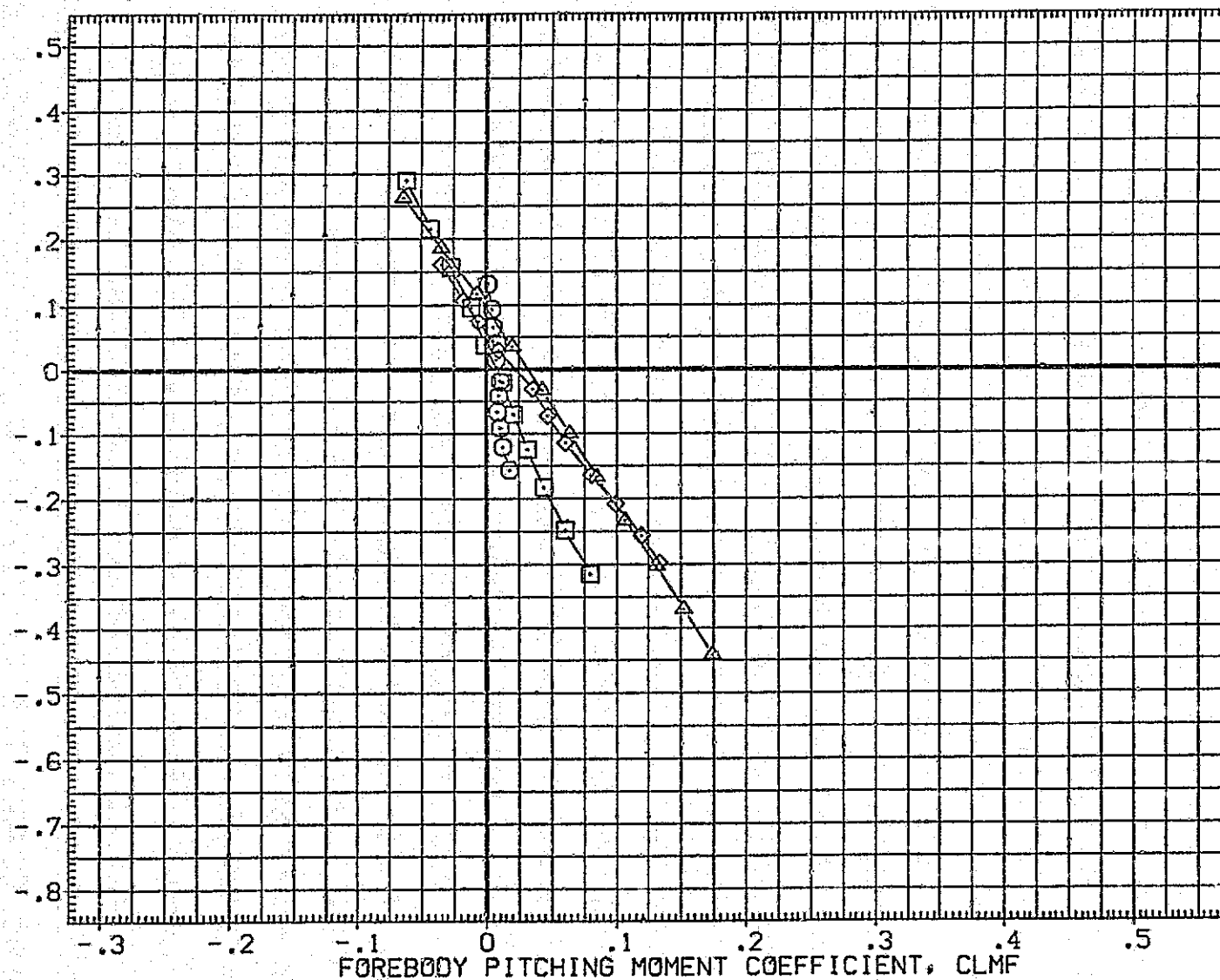


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (I)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C001)	MSFC 594(A33) 740TS (TIP1)
(A1C004)	MSFC 594(A33) 740TS (TIP1SIP2)
(A1C005)	MSFC 594(A33) 740TS (TIP101)
(A1C007)	MSFC 594(A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

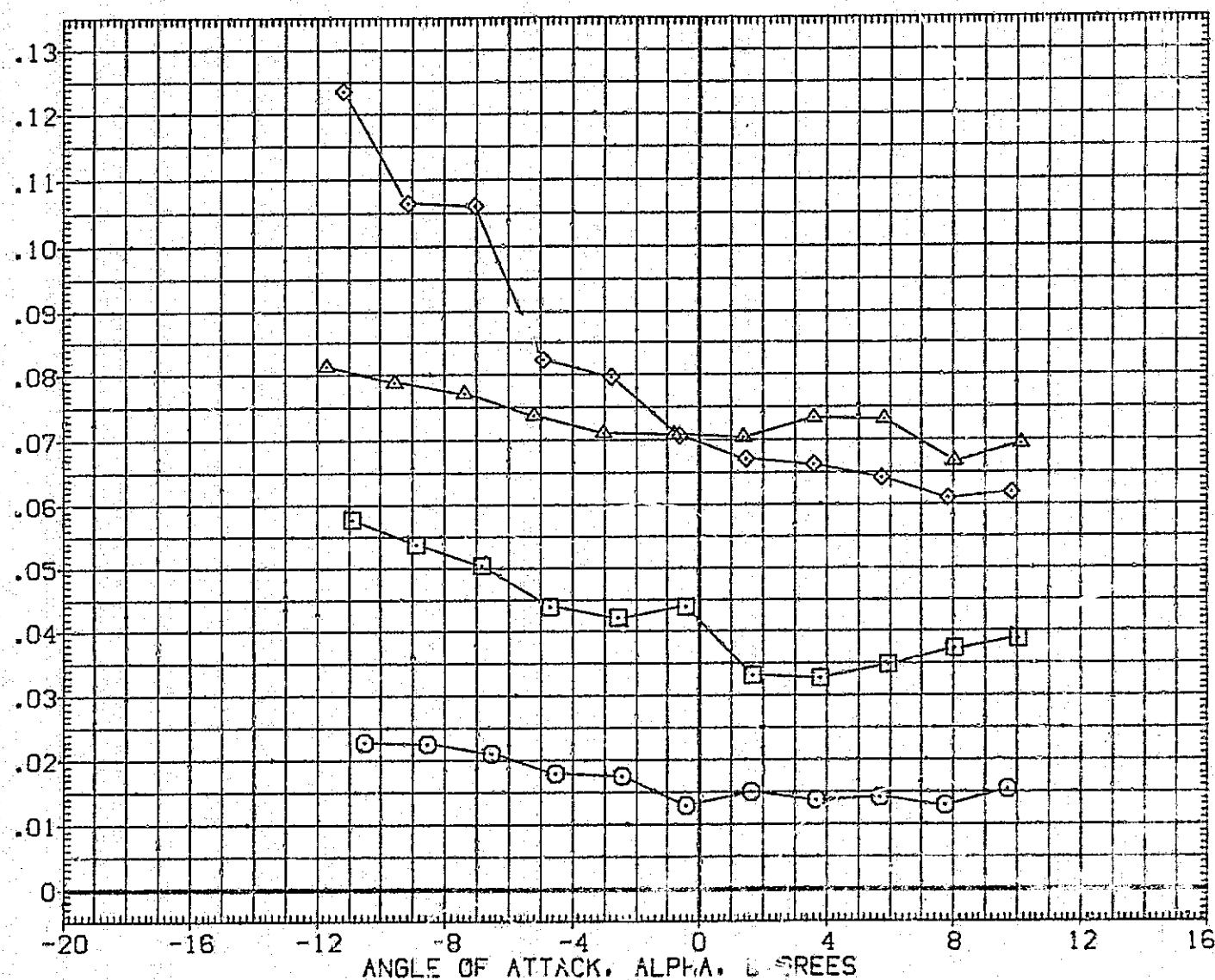


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	DATA NOT AVAILABLE
(AIC004)	DATA NOT AVAILABLE
(AIC005)	DATA NOT AVAILABLE
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

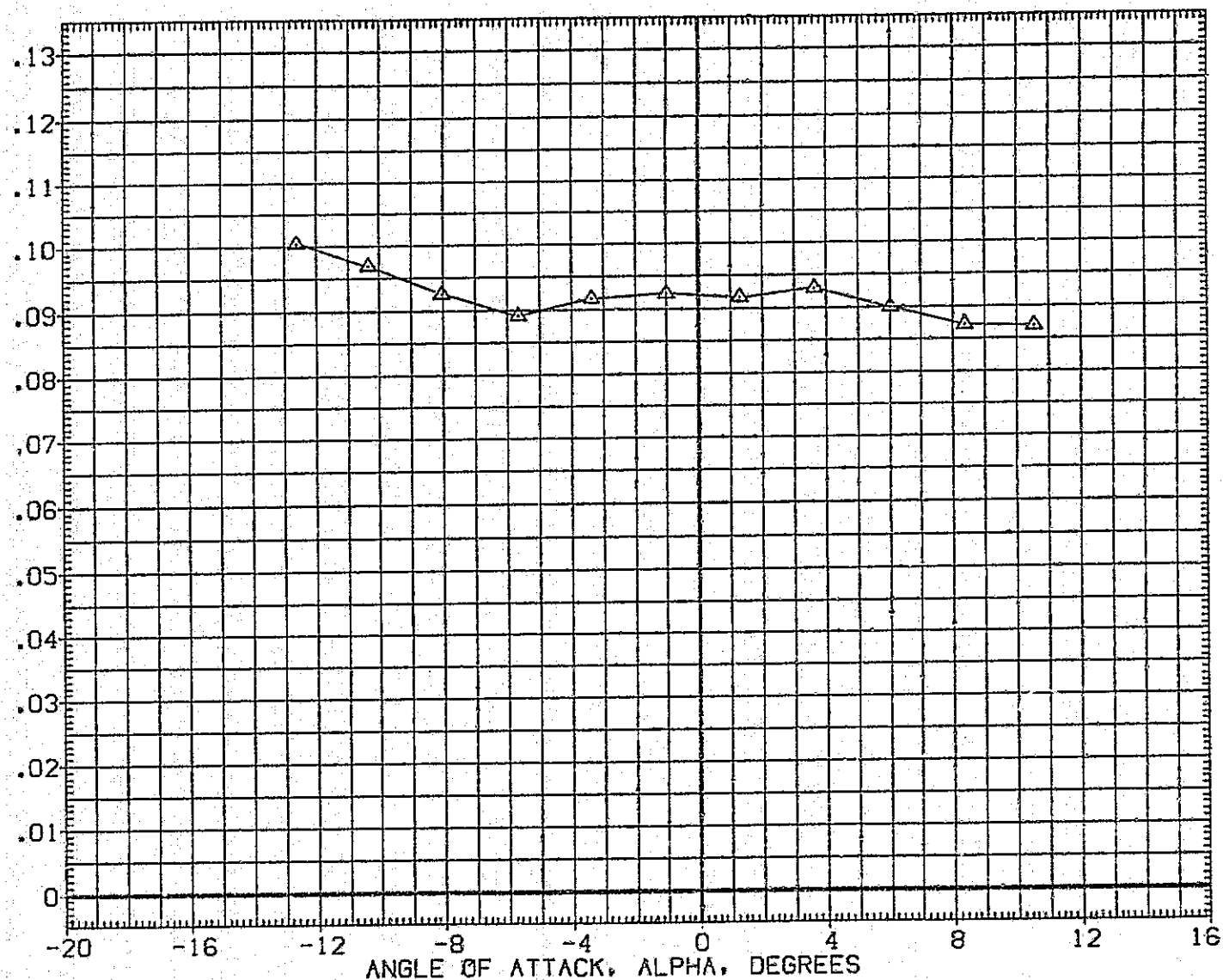


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(AIC001)	MSFC 594(1A33) 740TS (TIP1)	ET STING
(AIC004)	MSFC 594(1A33) 740TS (TIP1P2)	ET STING
(AIC005)	MSFC 594(1A33) 740TS (TIP101)	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (TIP1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

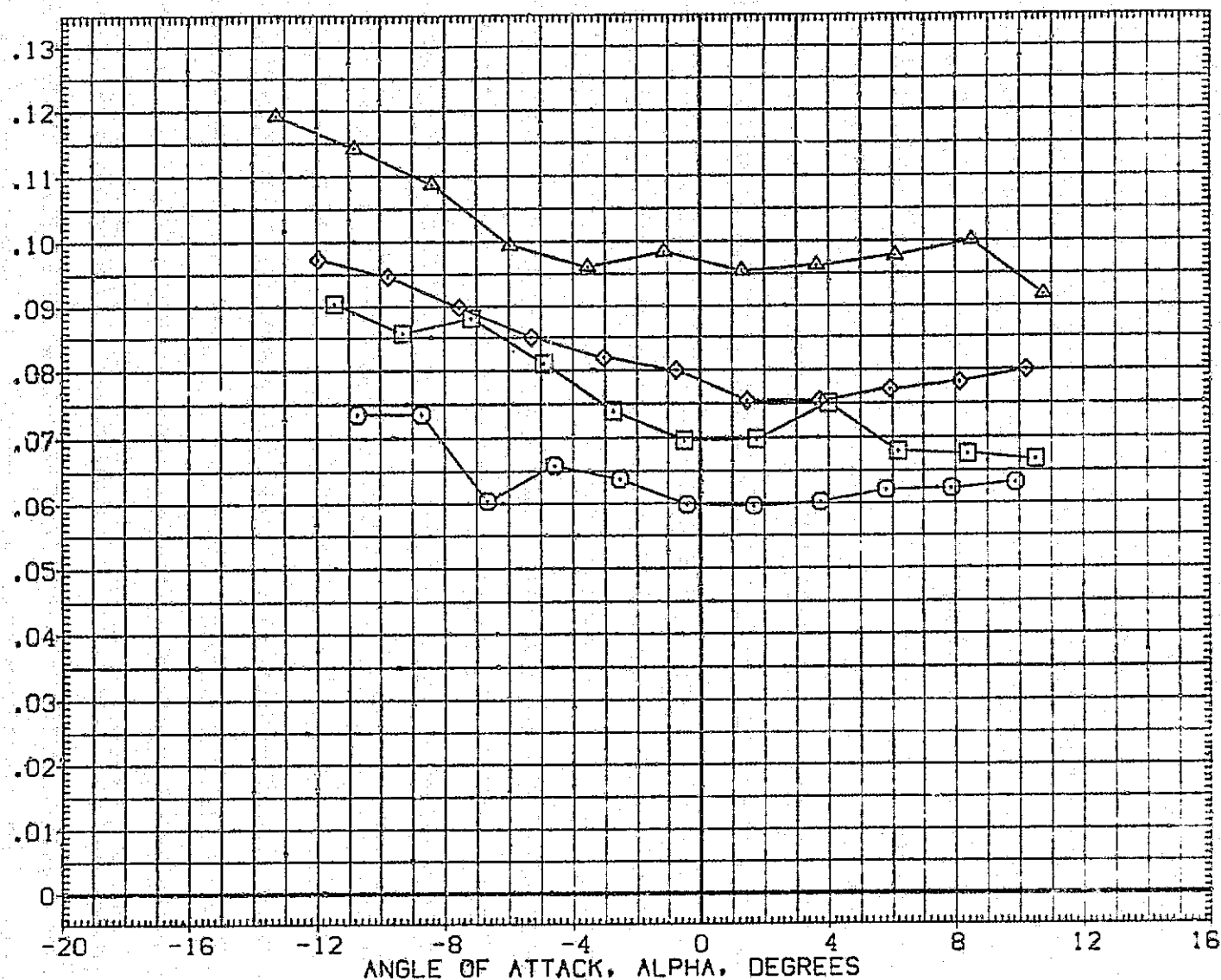


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (C)MACH = .90

DATA SET SYMBOL CONFIGURATION DESCRIPTION

[AIC001] □ DATA NOT AVAILABLE
 [AIC004] □ DATA NOT AVAILABLE
 [AIC005] □ DATA NOT AVAILABLE
 [AIC007] △ MSFC 594(A33) 740TS (TIPISI201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

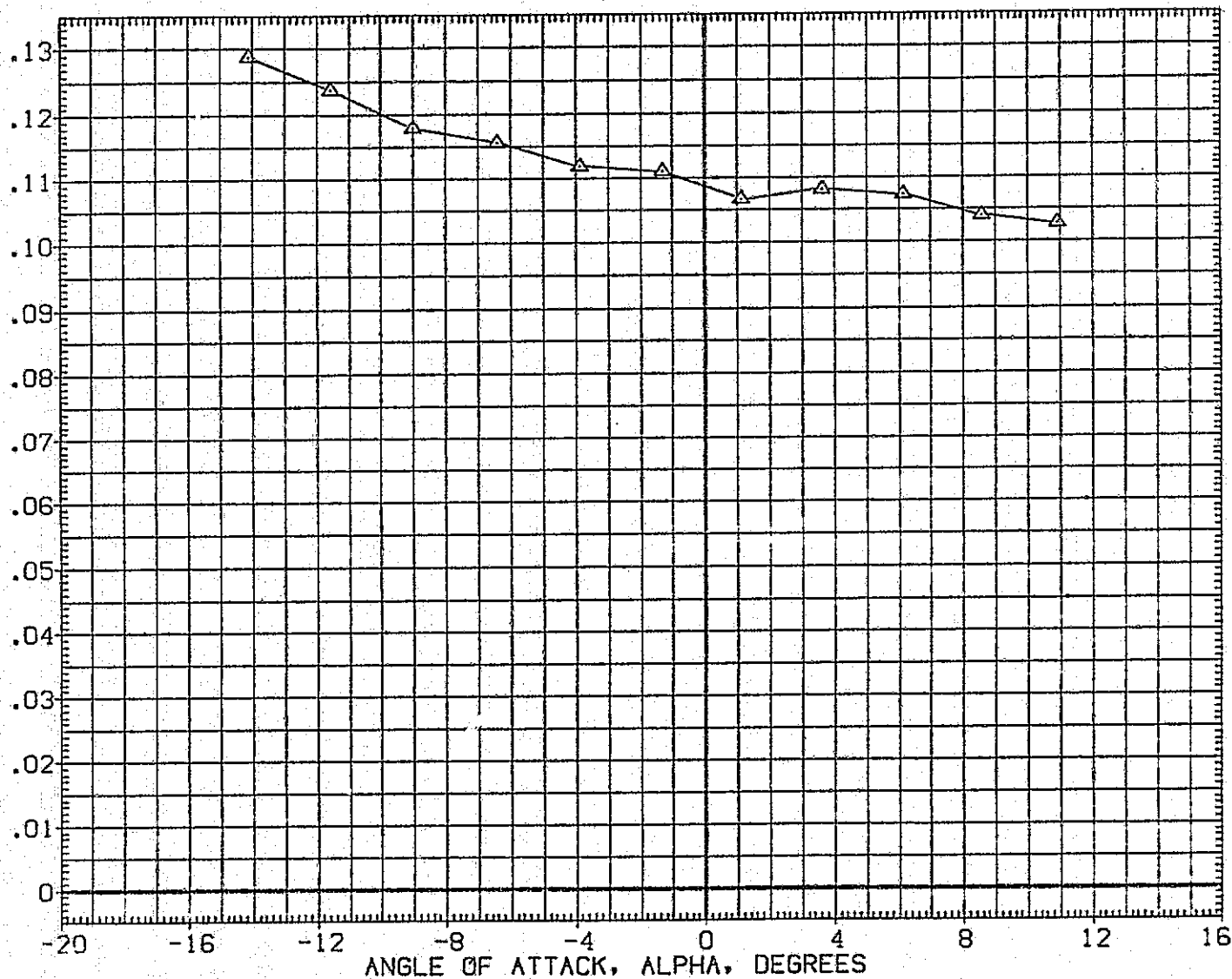


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
{A1C001}	MSFC S94(1A33) 740TS (TIP1)
{A1C004}	MSFC S94(1A33) 740TS (TIP1S1P2)
{A1C005}	MSFC S94(1A33) 740TS (TIP101)
{A1C007}	MSFC S94(1A33) 740TS (TIP1S1P201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

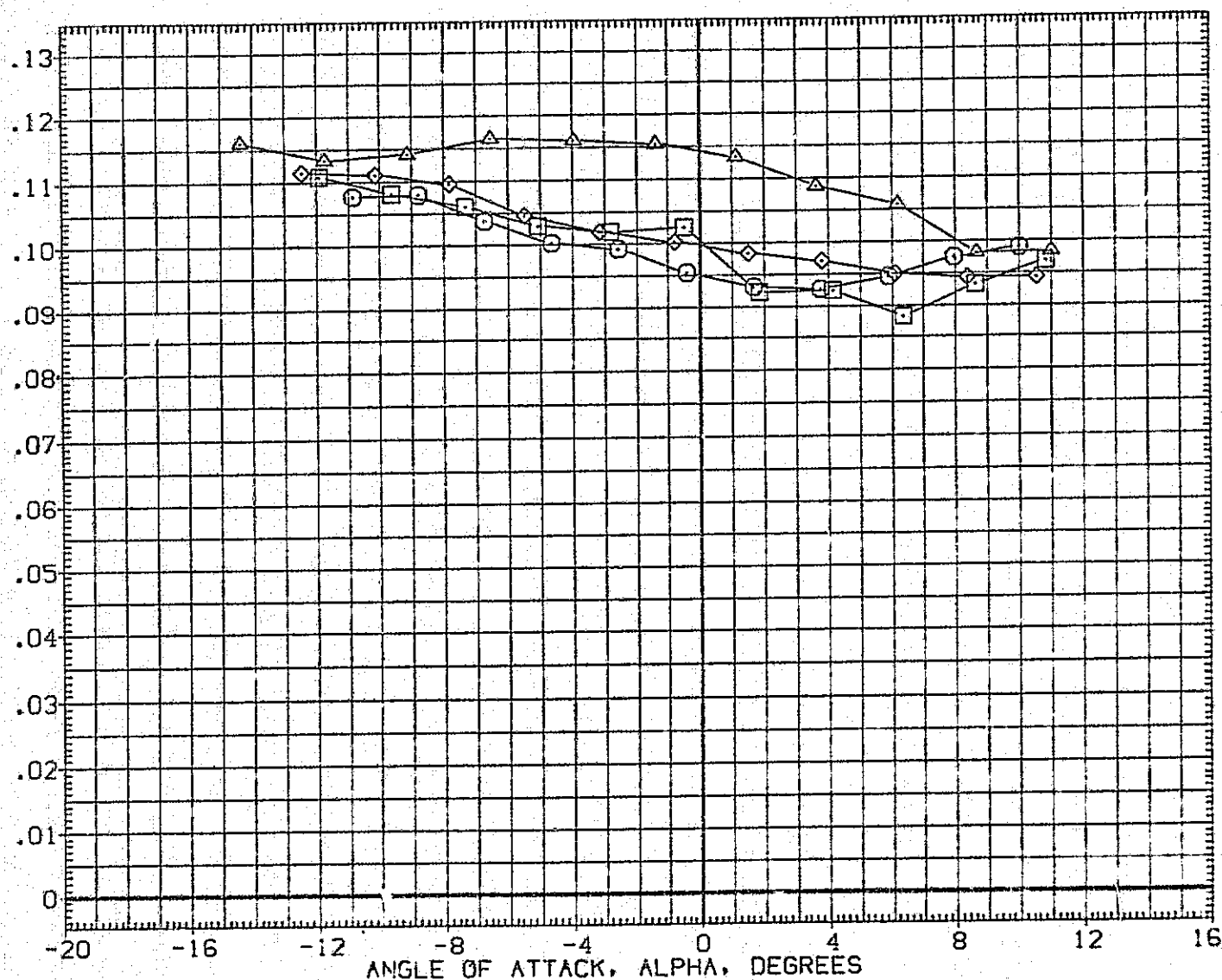


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	MSFC 594 (A33) 740TS (TIP1)
(AIC004)	MSFC 594 (A33) 740TS (TIPISIP2)
(AIC005)	MSFC 594 (A33) 740TS (TIPID1)
(AIC007)	MSFC 594 (A33) 740TS (TIPISIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

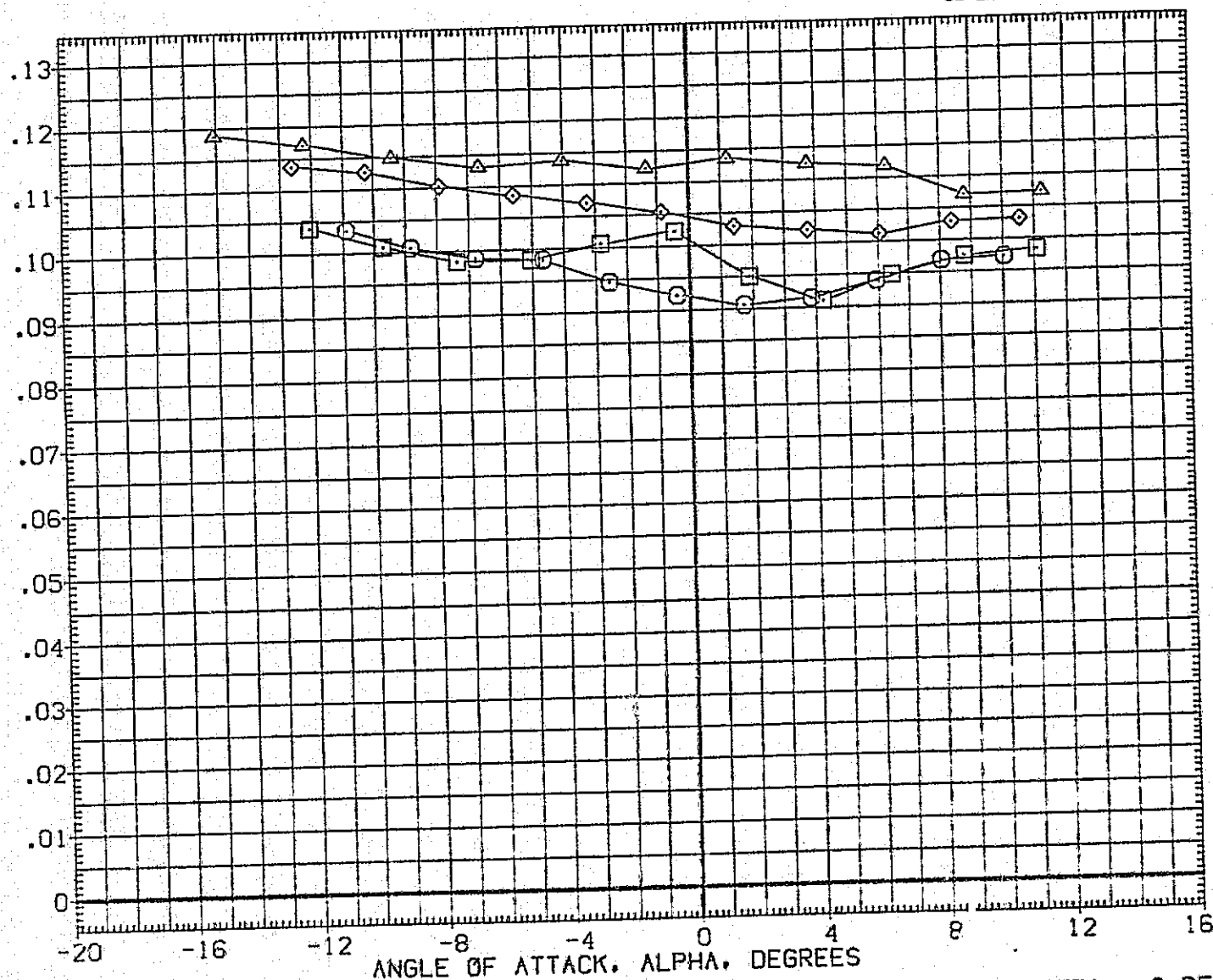


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(F)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
[AIC001]	DATA NOT AVAILABLE
[AIC004]	DATA NOT AVAILABLE
[AIC005]	DATA NOT AVAILABLE
[AIC007]	MSFC 594(1A33) 740TS (TIPISIP201) OFB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

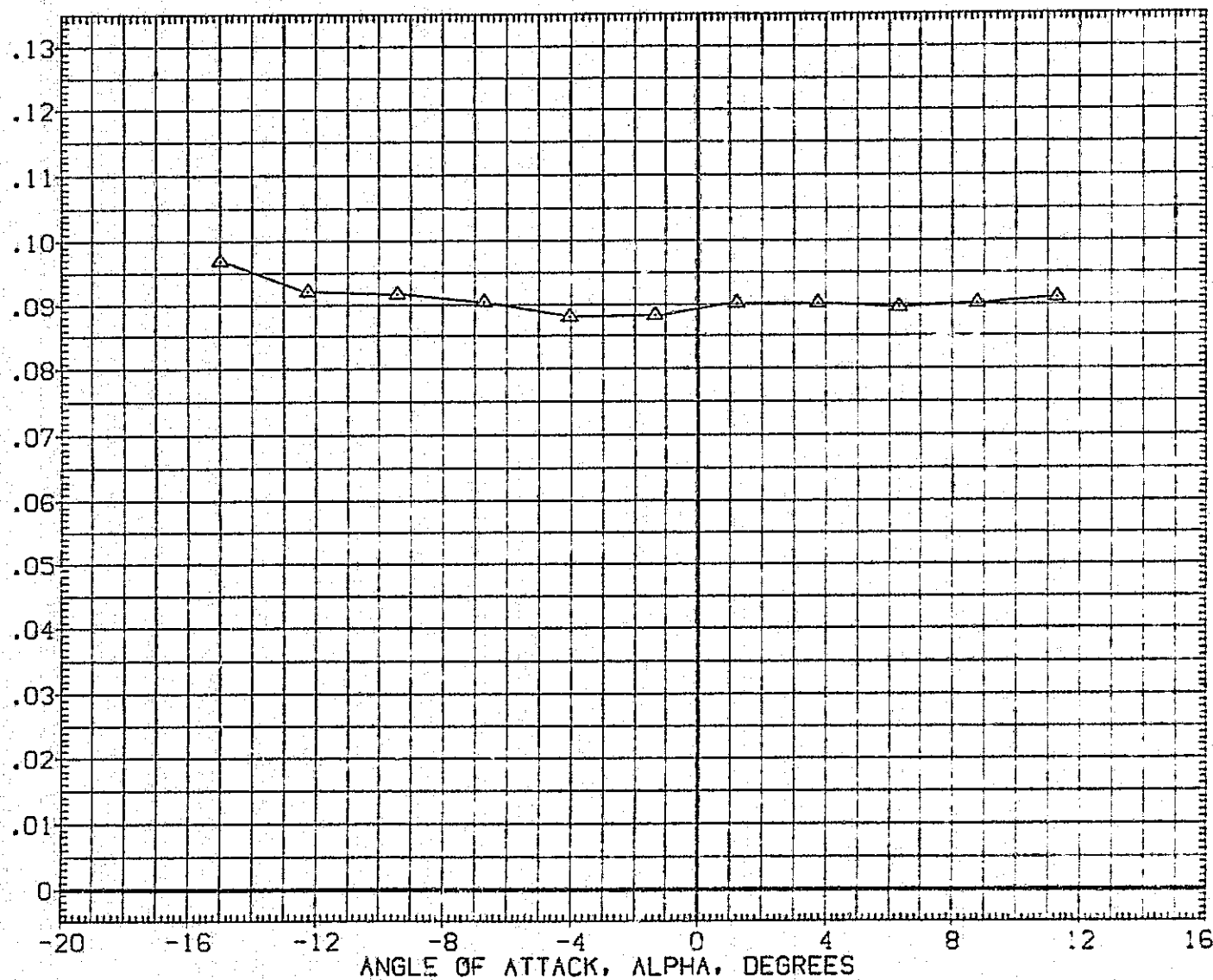


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(G)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	MSFC 594(1A33) 740TS (TIP)
(AIC004)	MSFC 594(1A33) 740TS (TIP)SIP2)
(AIC005)	MSFC 594(1A33) 740TS (TIP)01)
(AIC007)	MSFC 594(1A33) 740TS (TIP)SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

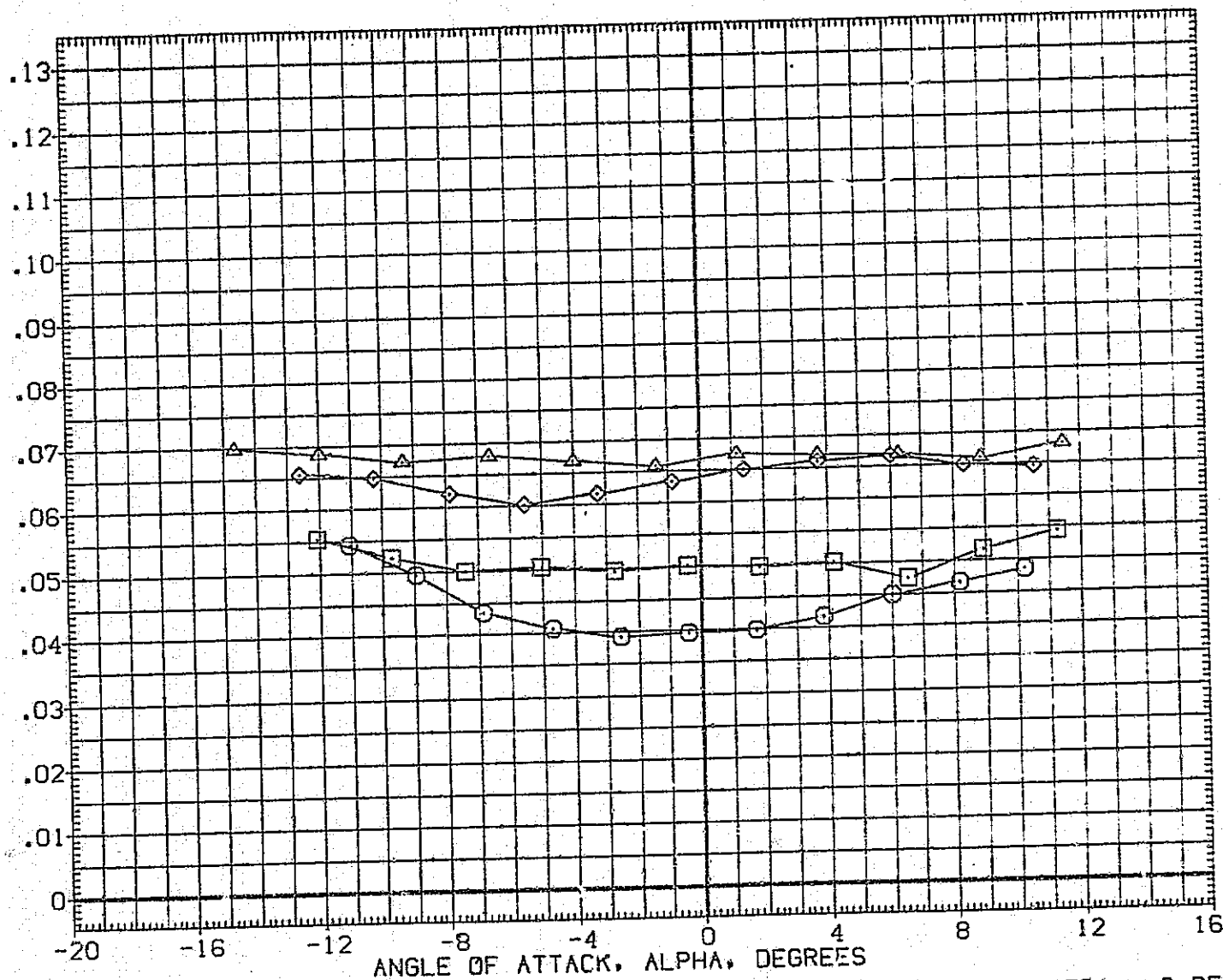


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (H)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	MSFC 594(IA33) 740TS (TIP1)
(AIC004)	MSFC 594(IA33) 740TS (TIPISIP2)
(AIC005)	MSFC 594(IA33) 740TS (TIP101)
(AIC007)	MSFC 594(IA33) 740TS (TIPISIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

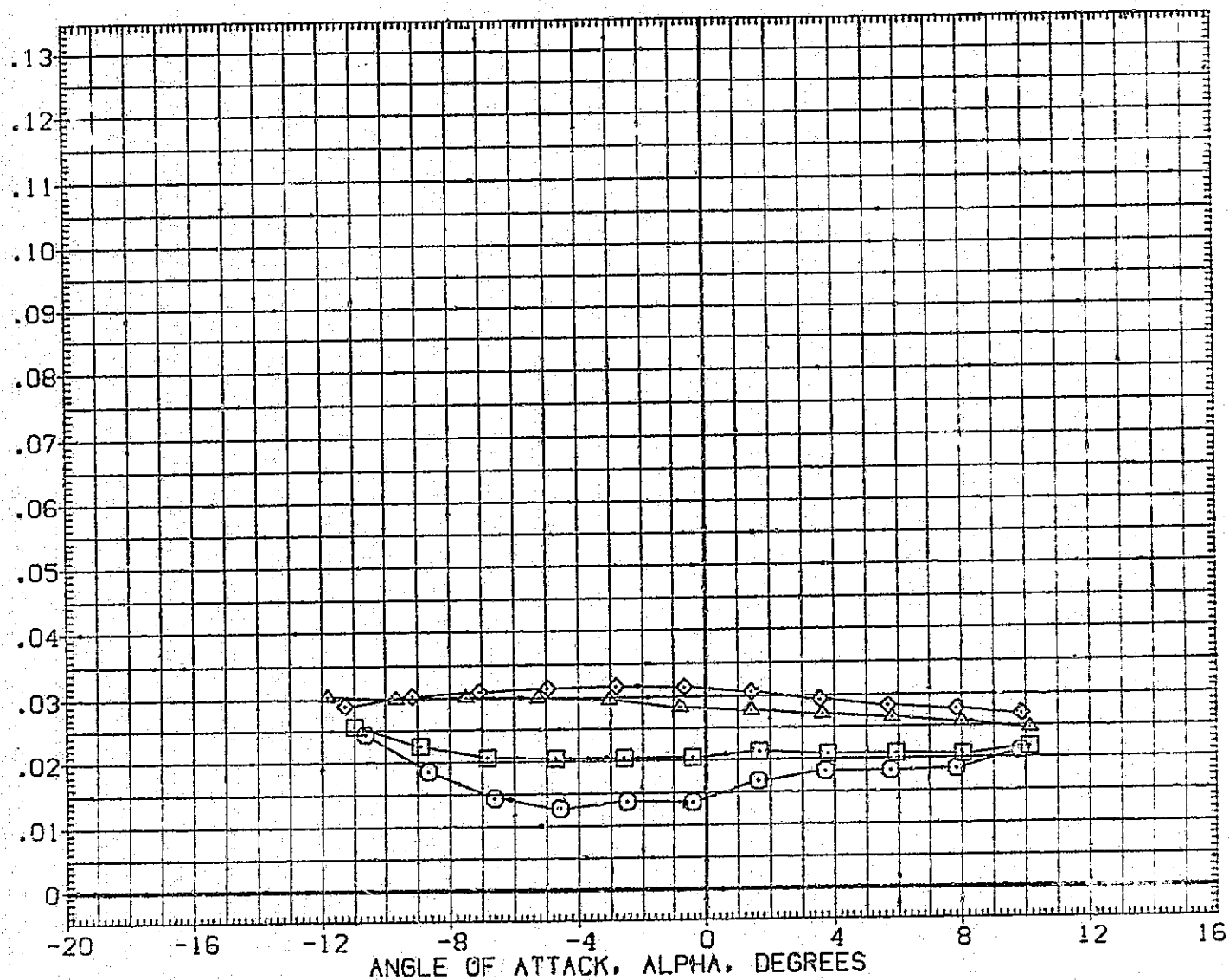


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(1)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	MSFC 594(I A33) 740TS (TIP1)
(AIC004)	MSFC 594(I A33) 740TS (TIP1SIP2)
(AIC005)	MSFC 594(I A33) 740TS (TIP101)
(AIC007)	MSFC 594(I A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XI-RP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

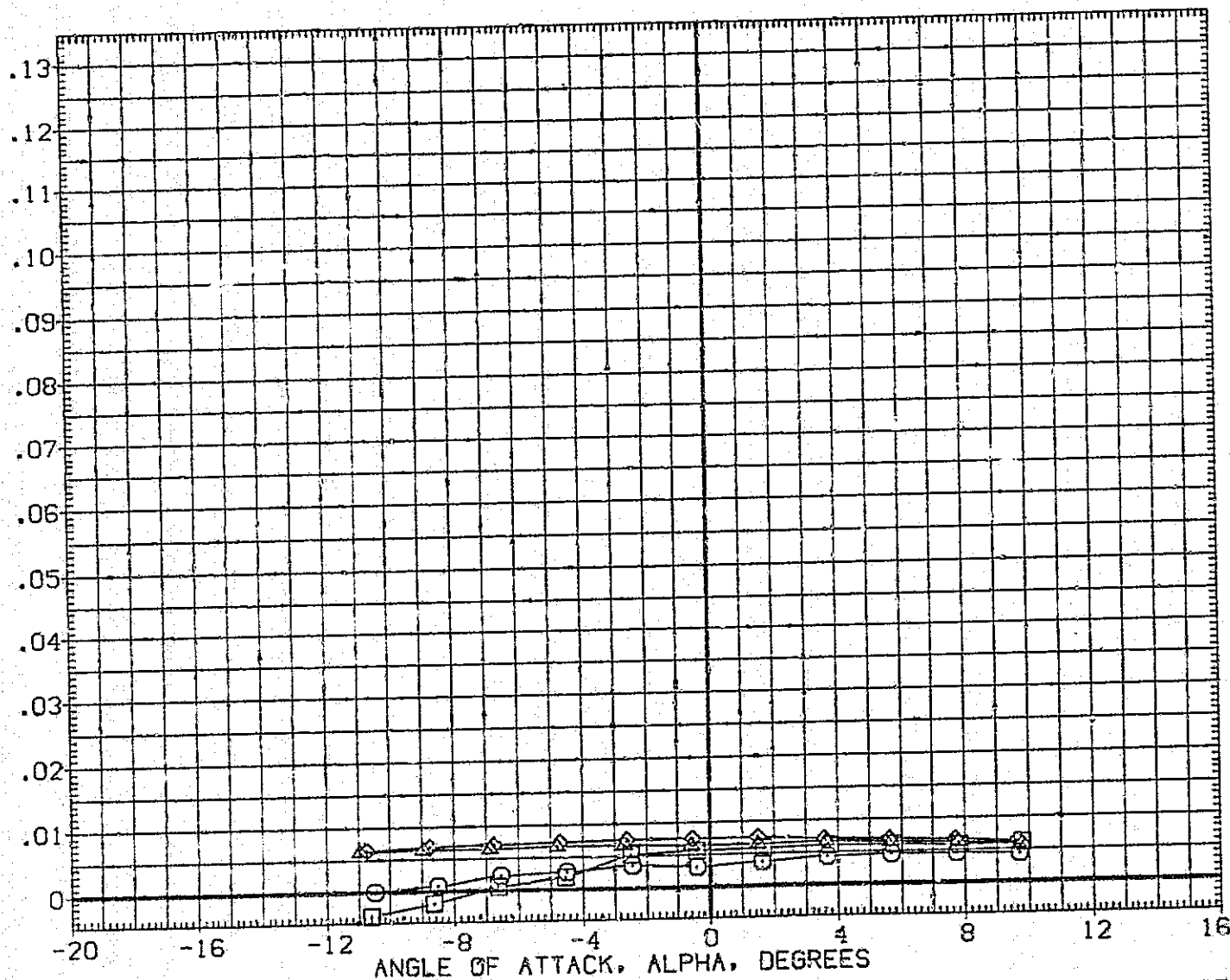


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	MSFC 594(1A33) 740TS (TIP1)
(AIC004)	MSFC 594(1A33) 740TS (TIPISIP2)
(AIC005)	MSFC 594(1A33) 740'S (TIP101)
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

SRB BASE AXIAL FORCE COEFFICIENT, CABS

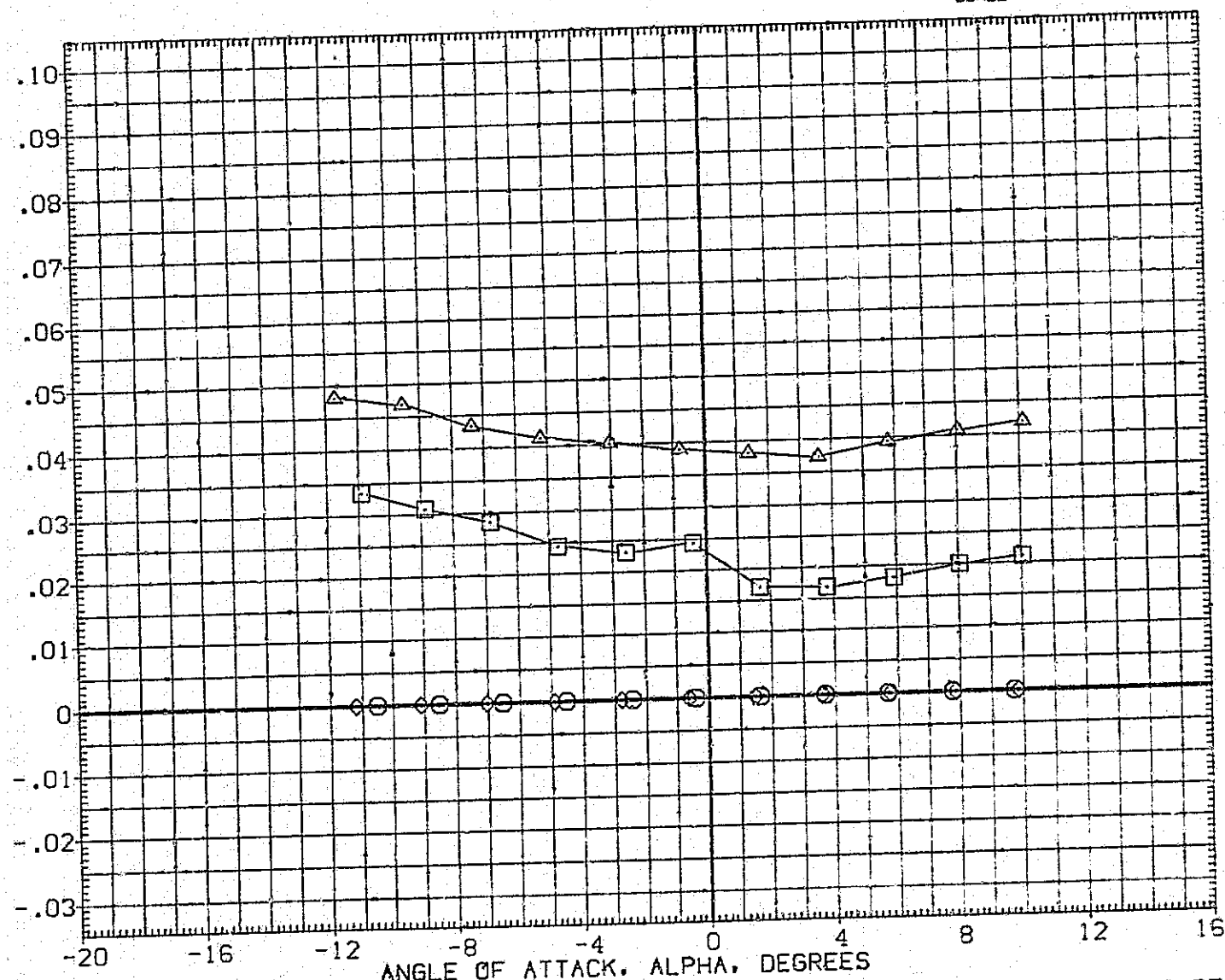


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	DATA NOT AVAILABLE
(AIC004)	DATA NOT AVAILABLE
(AIC005)	DATA NOT AVAILABLE
(AIC007)	MSFC 594 (A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	4 0.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

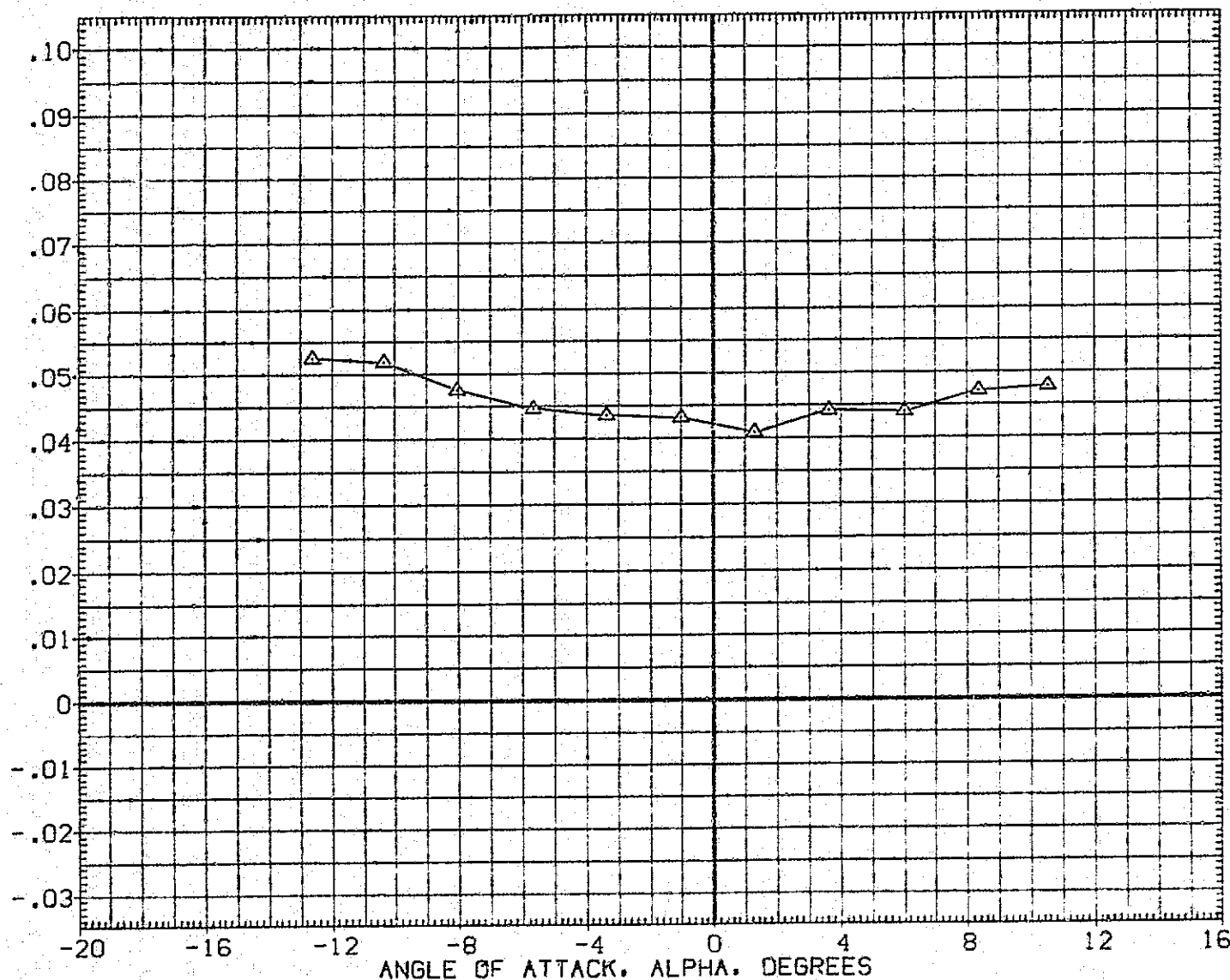


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(AIC001)	MSFC 594(A33) 740TS (TIP1)	ET STING
(AIC004)	MSFC 594(A33) 740TS (TIPISIP2)	ET STING
(AIC005)	MSFC 594(A33) 740TS (TIP101)	ORB STING
(AIC007)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2590.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

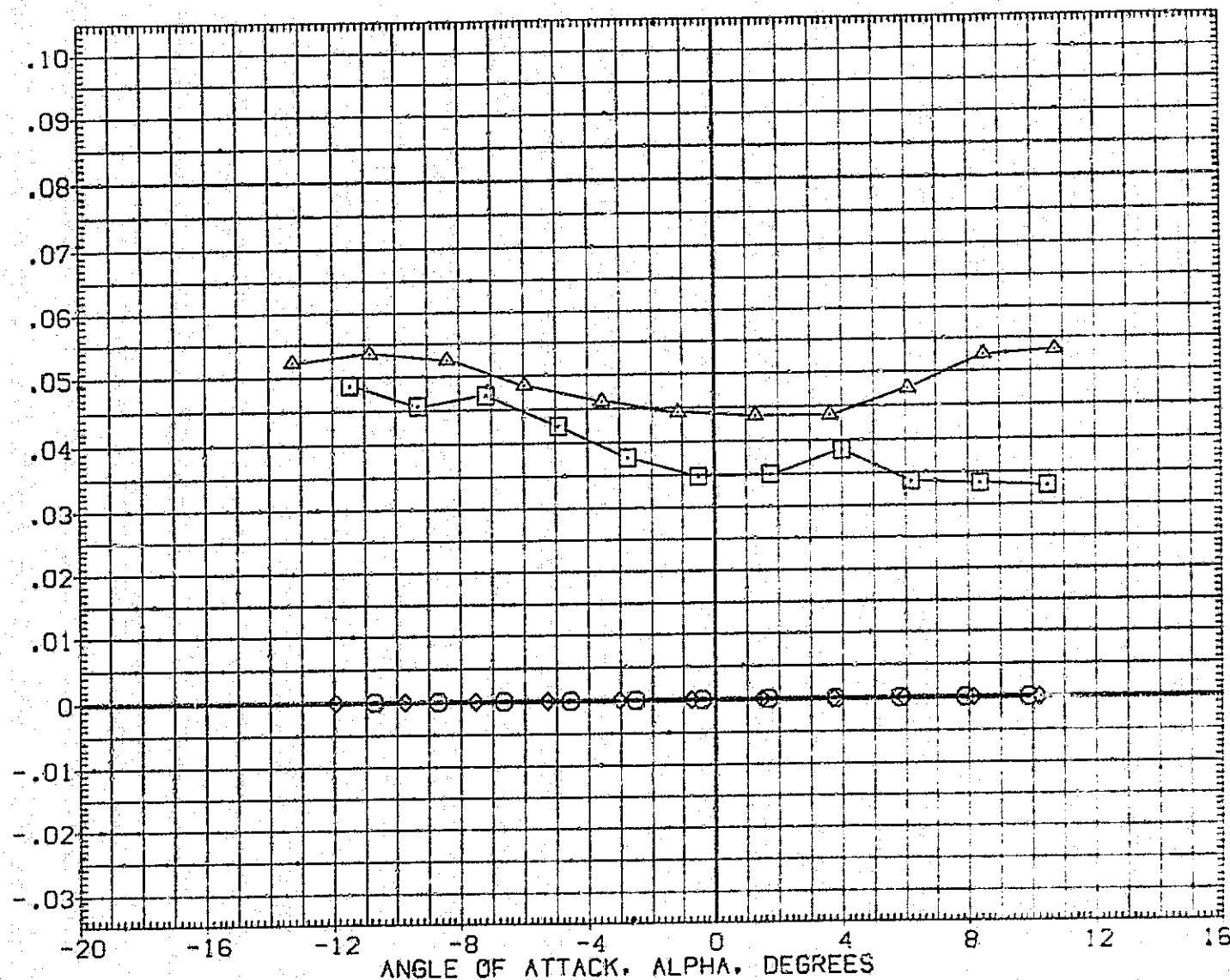


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(C)MACH = .90

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(AIC001) □ DATA NOT AVAILABLE
 (AIC004) □ DATA NOT AVAILABLE
 (AIC005) ◇ DATA NOT AVAILABLE
 (AIC007) △ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0340

SRB BASE AXIAL FORCE COEFFICIENT, CABS

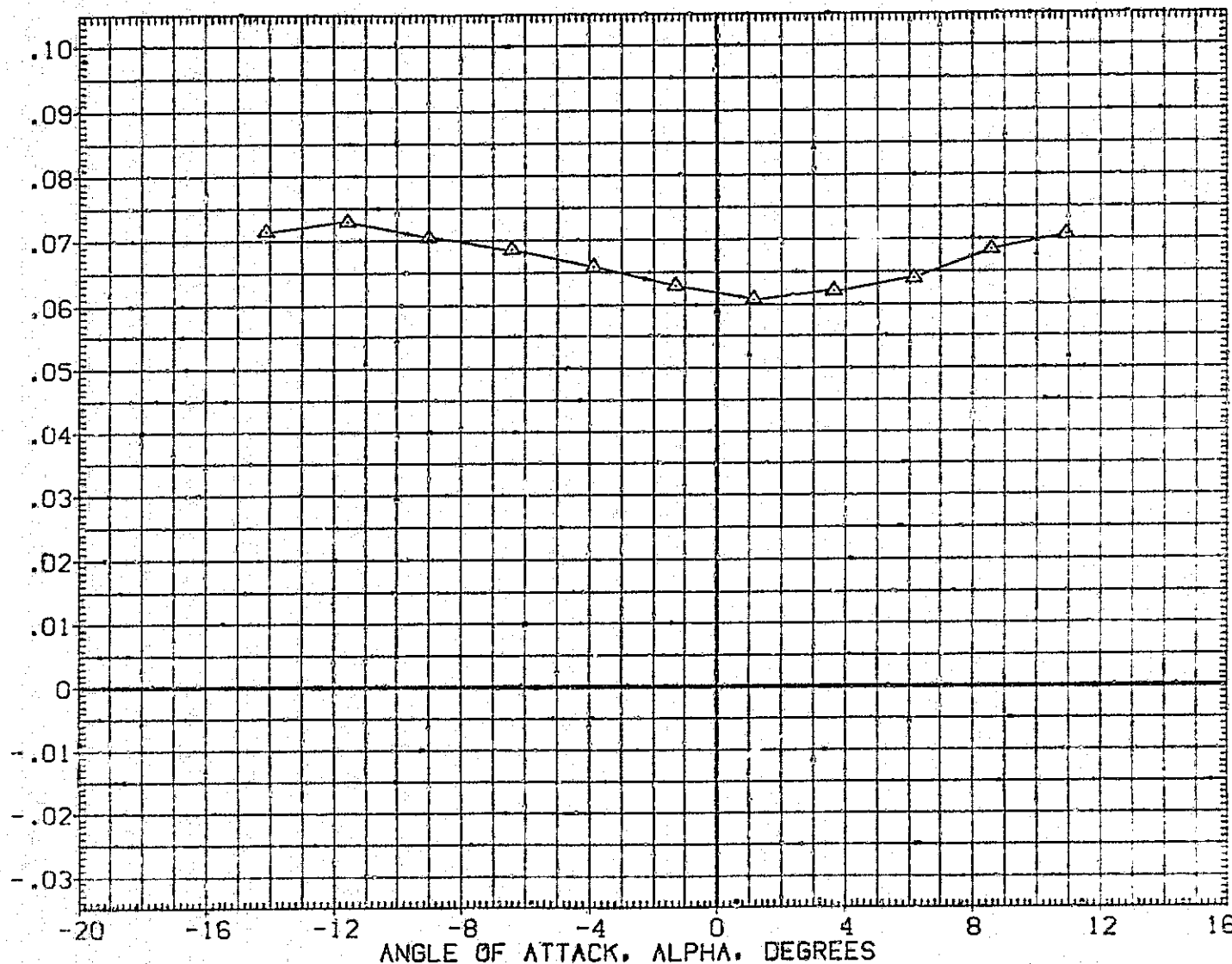


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	MSFC S94(1A33) 740TS (TIP1)
(AIC004)	MSFC S94(1A33) 740TS (TIPISIP2)
(AIC005)	MSFC S94(1A33) 740TS (TIPIC1)
(AIC007)	MSFC S94(1A33) 740TS (TIPISIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0003	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

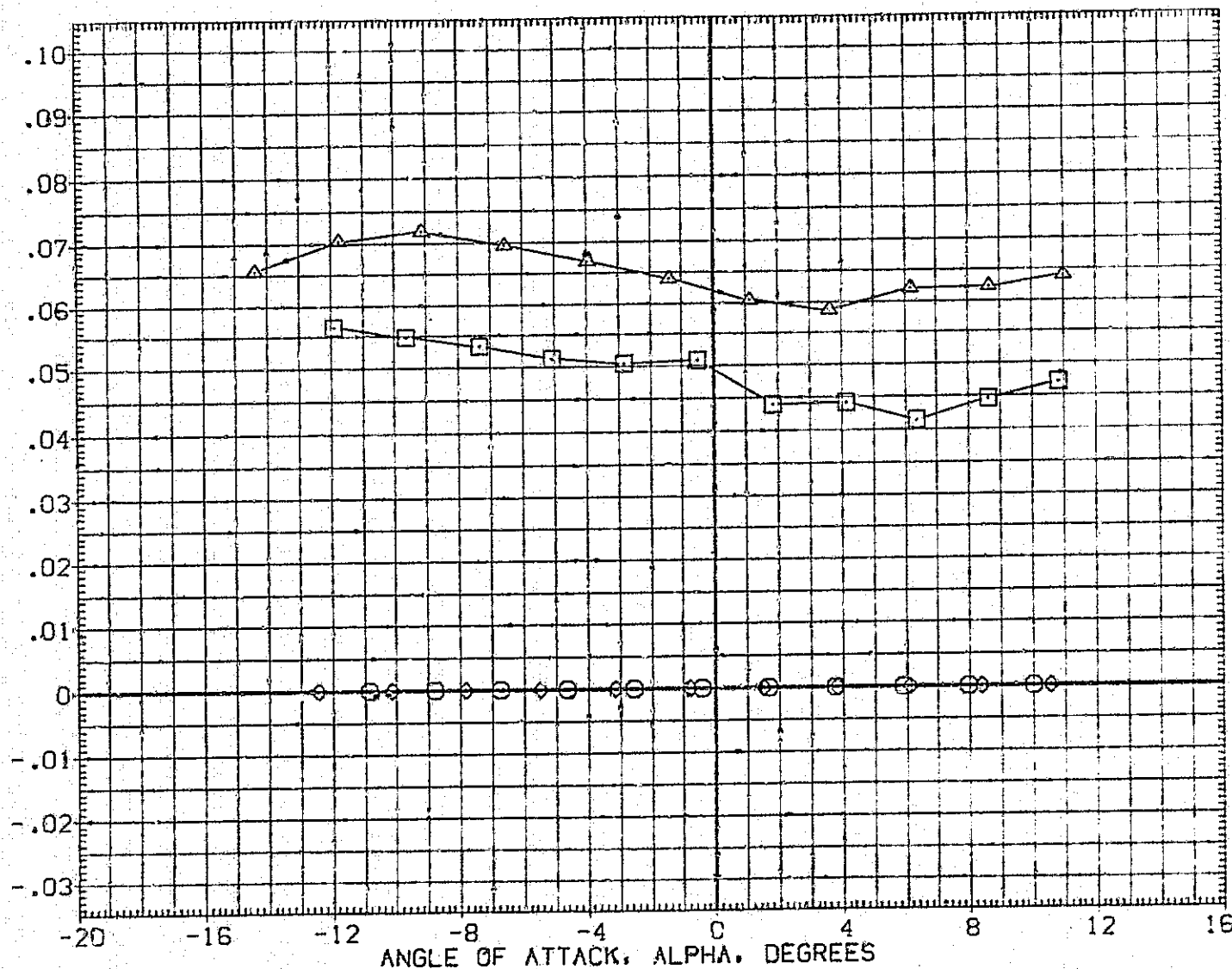


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	MSFC 594(1A33) 740TS (TIP1)
(AIC004)	MSFC 594(1A33) 740TS (TIP1SIP2)
(AIC005)	MSFC 594(1A33) 740TS (TIP101)
(AIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. YT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

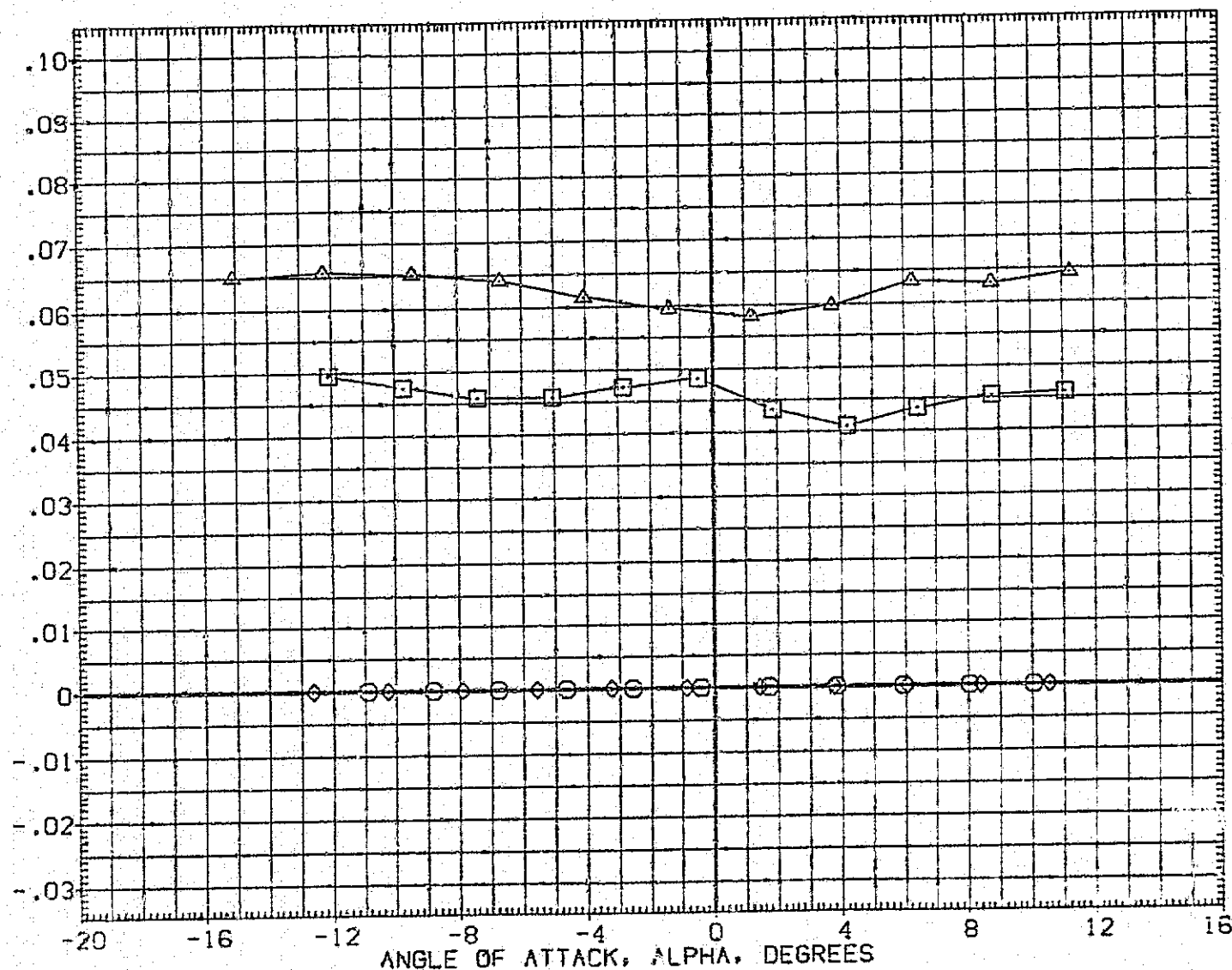


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(F)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	DATA NOT AVAILABLE
(AIC004)	DATA NOT AVAILABLE
(AIC005)	DATA NOT AVAILABLE
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION		
SREF	2680.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

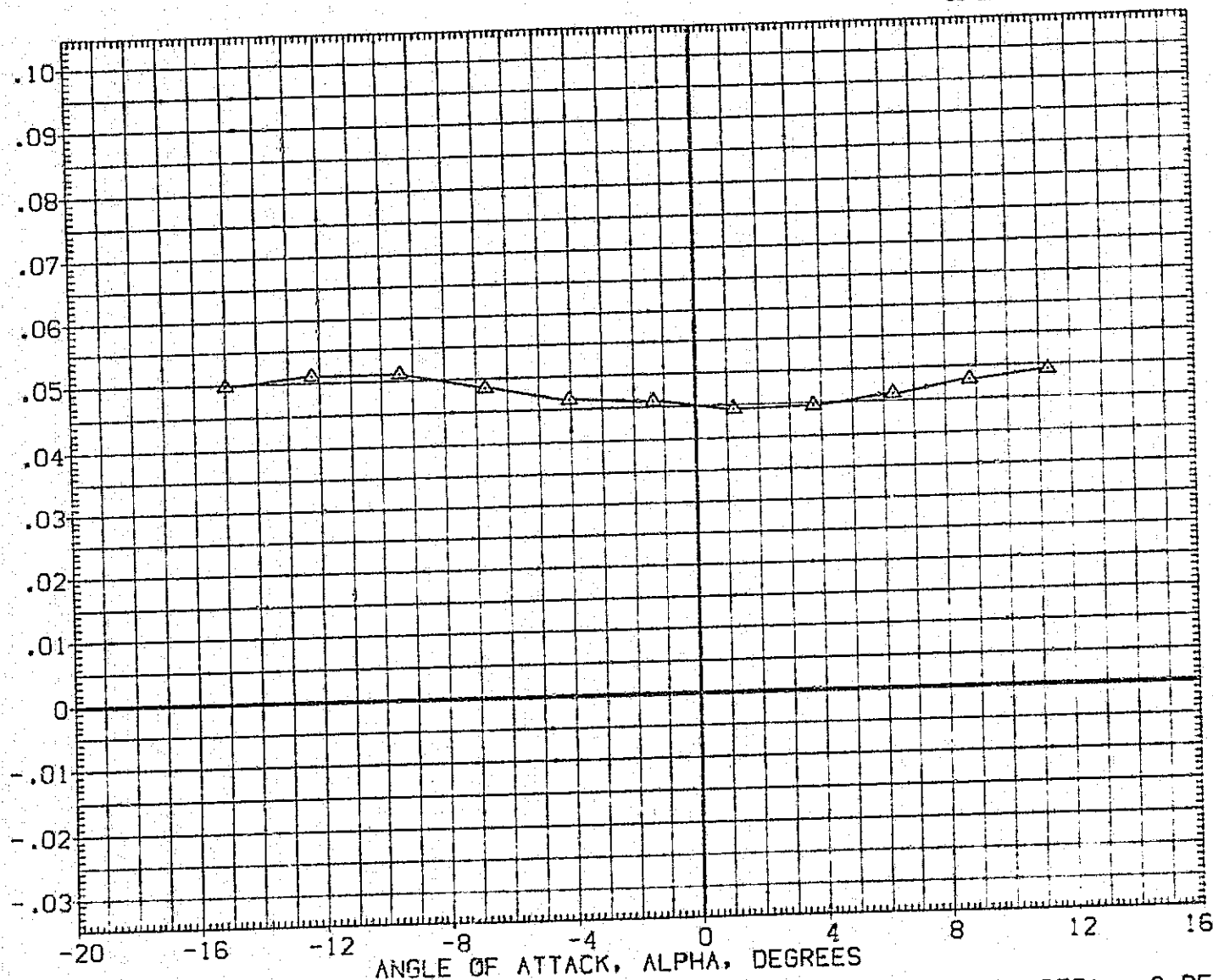


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (G)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	MSFC 594(A33) 740TS (TIP1)
(AIC004)	MSFC 594(A33) 740TS (TIP1P2)
(AIC005)	MSFC 594(A33) 740TS (TIP101)
(AIC007)	MSFC 594(A33) 740TS (TIP1P201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION

SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

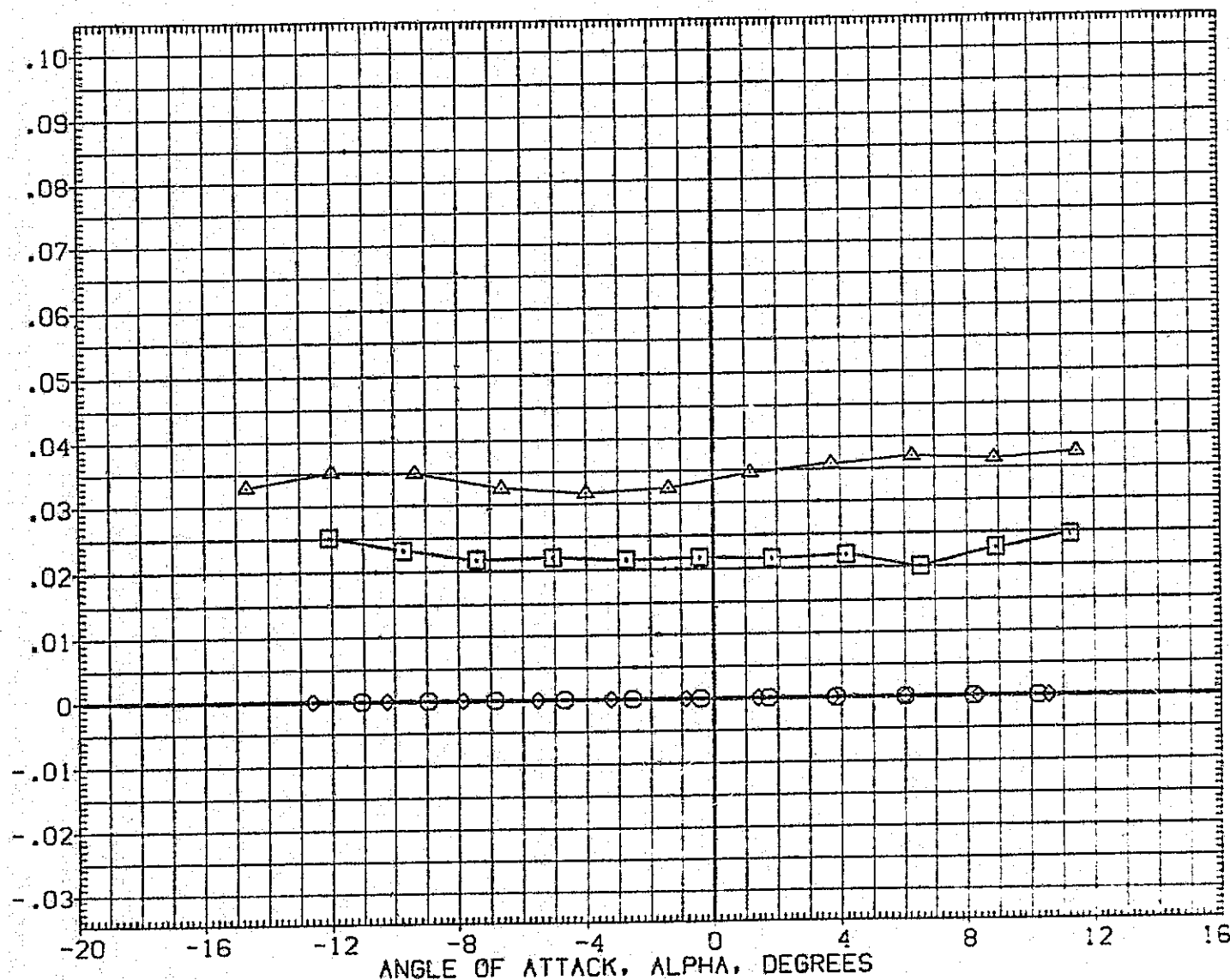


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (H)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(AIC001)	MSFC 594(A33) 740TS (TIP1)	ET STING
(AIC004)	MSFC 594(A33) 740TS (TIP1S1P2)	ET STING
(AIC005)	MSFC 594(A33) 740TS (TIP101)	ORB STING
(AIC007)	MSFC 594(A33) 740TS (TIP1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

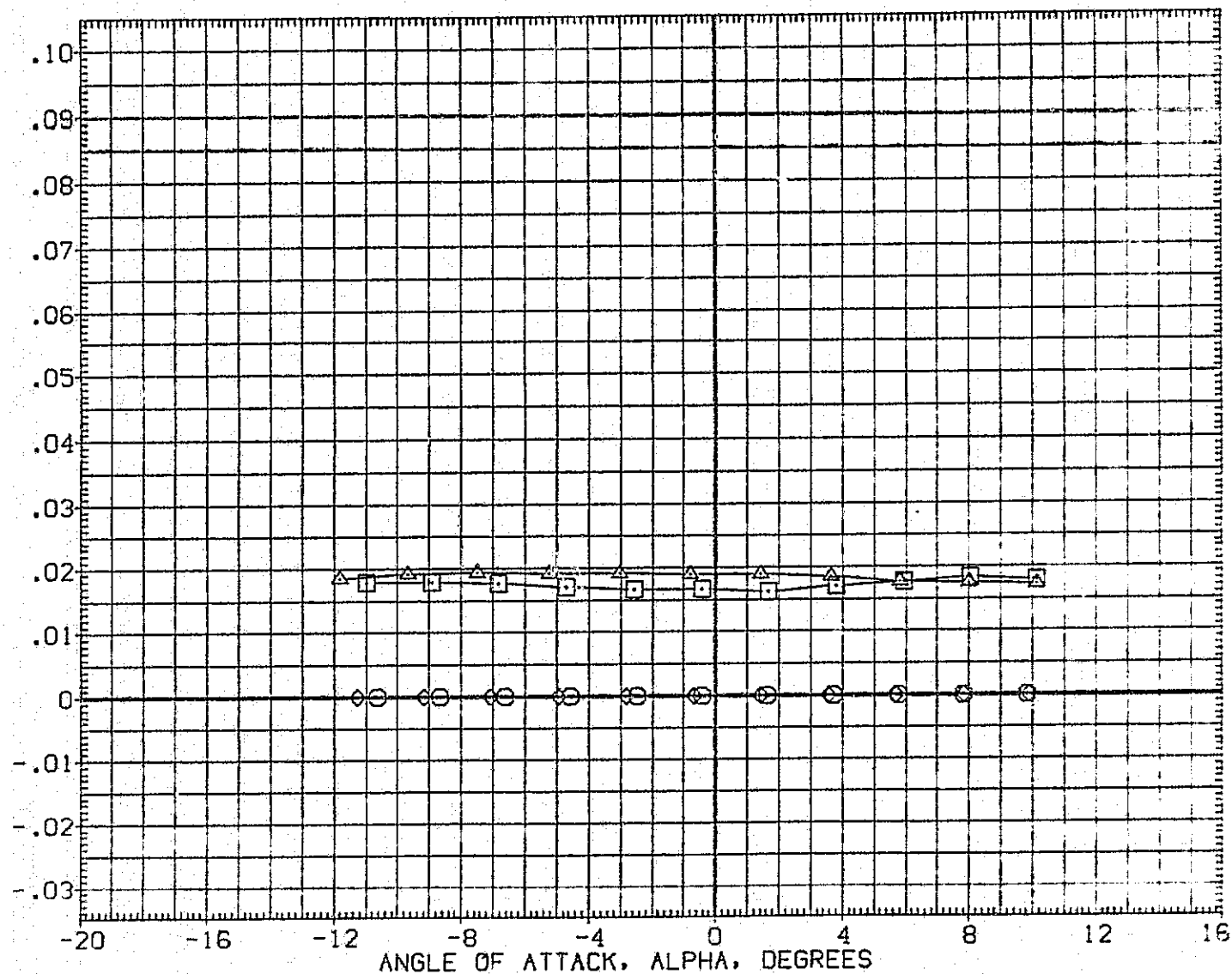


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (1)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	MSFC 594 (IA33) 740TS (TIP1)
(AIC004)	MSFC 594 (IA33) 740TS (TIP1SIP2)
(AIC005)	MSFC 594 (IA33) 740TS (TIP101)
(AIC007)	MSFC 594 (IA33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

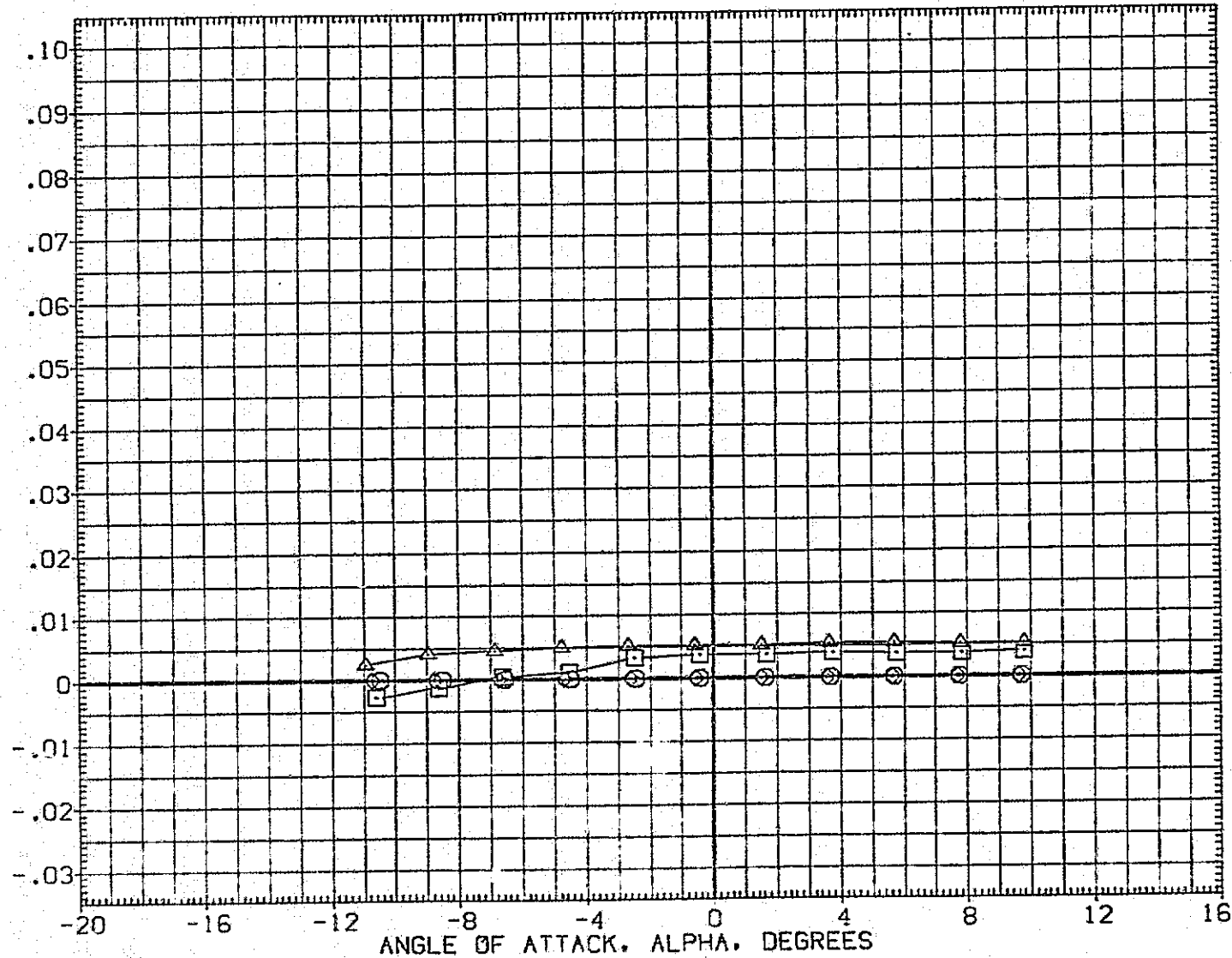


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	MSFC 594(1A33) 740TS (TIP1)
(AIC004)	MSFC 594(1A33) 740TS (TIP1SIP2)
(AIC005)	MSFC 594(1A33) 740TS (TIP101)
(AIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

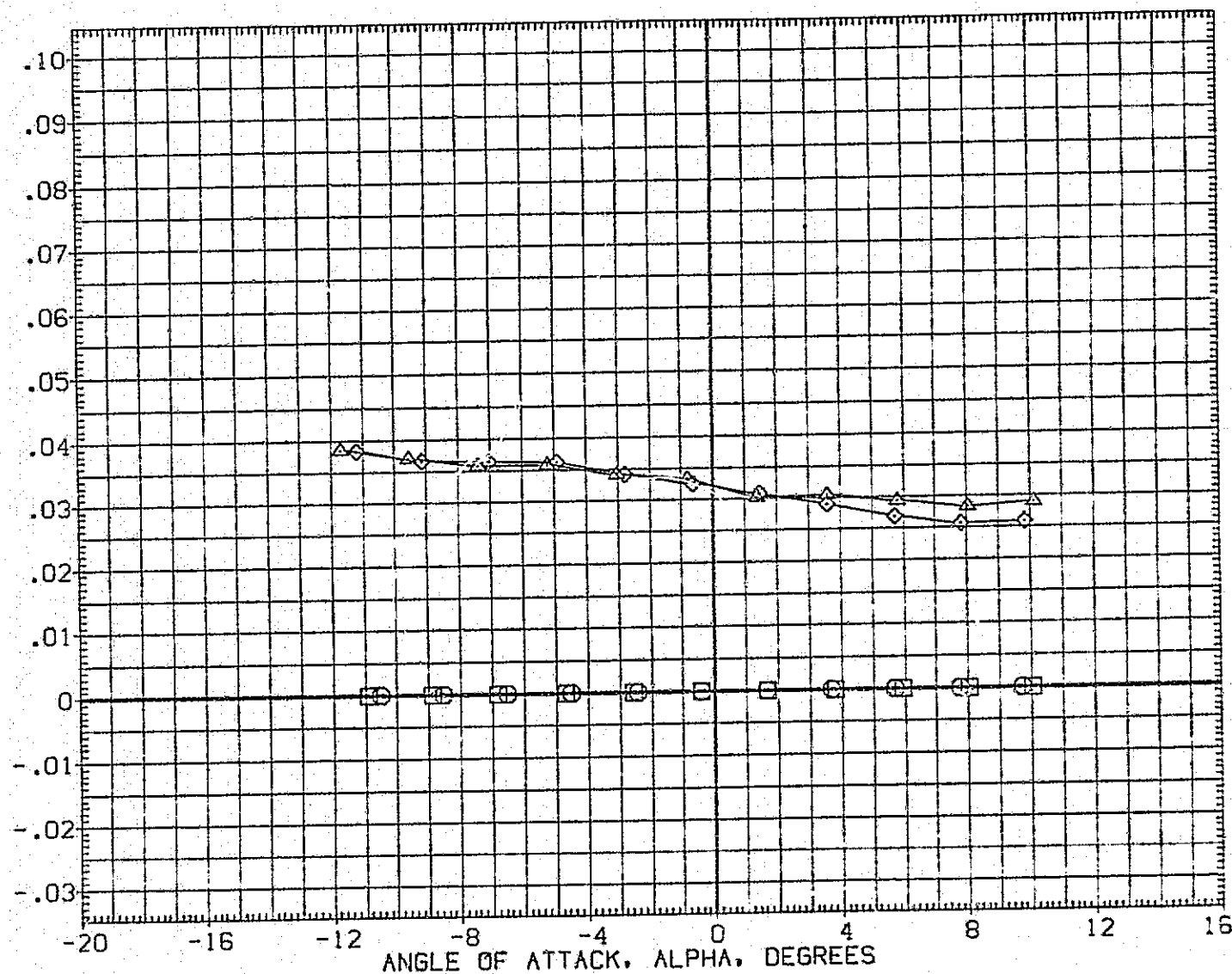


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (A)MACH .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
{AIC001}	DATA NOT AVAILABLE
{AIC004}	DATA NOT AVAILABLE
{AIC005}	DATA NOT AVAILABLE
{AIC007}	MSFC S94(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

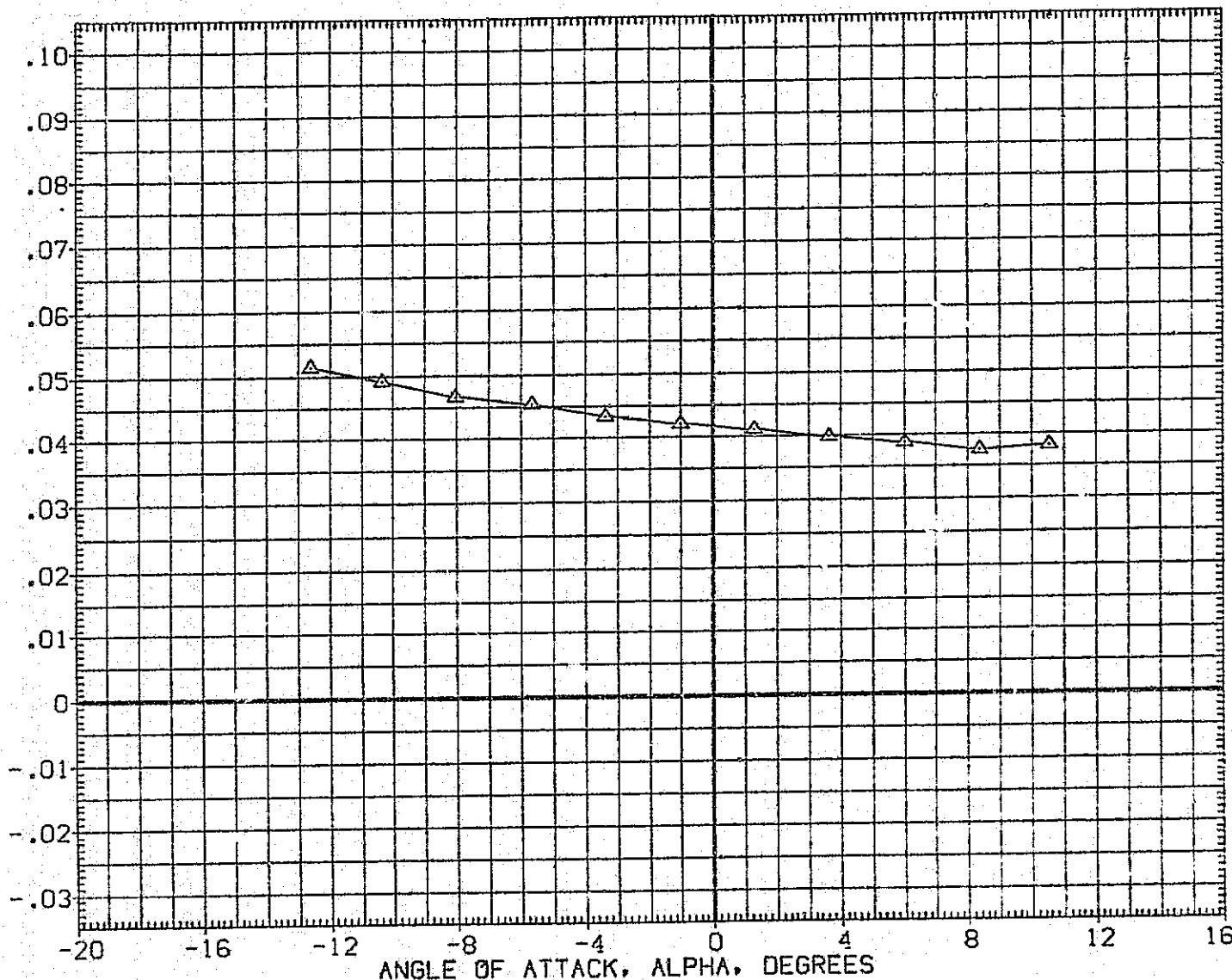


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	MSFC 594(A33) 740TS (TIP1)
(AIC004)	MSFC 594(A33) 740TS (TIPISIP21)
(AIC005)	MSFC 594(A33) 740TS (TIP101)
(AIC007)	MSFC 594(A33) 740TS (TIPISIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{B0}

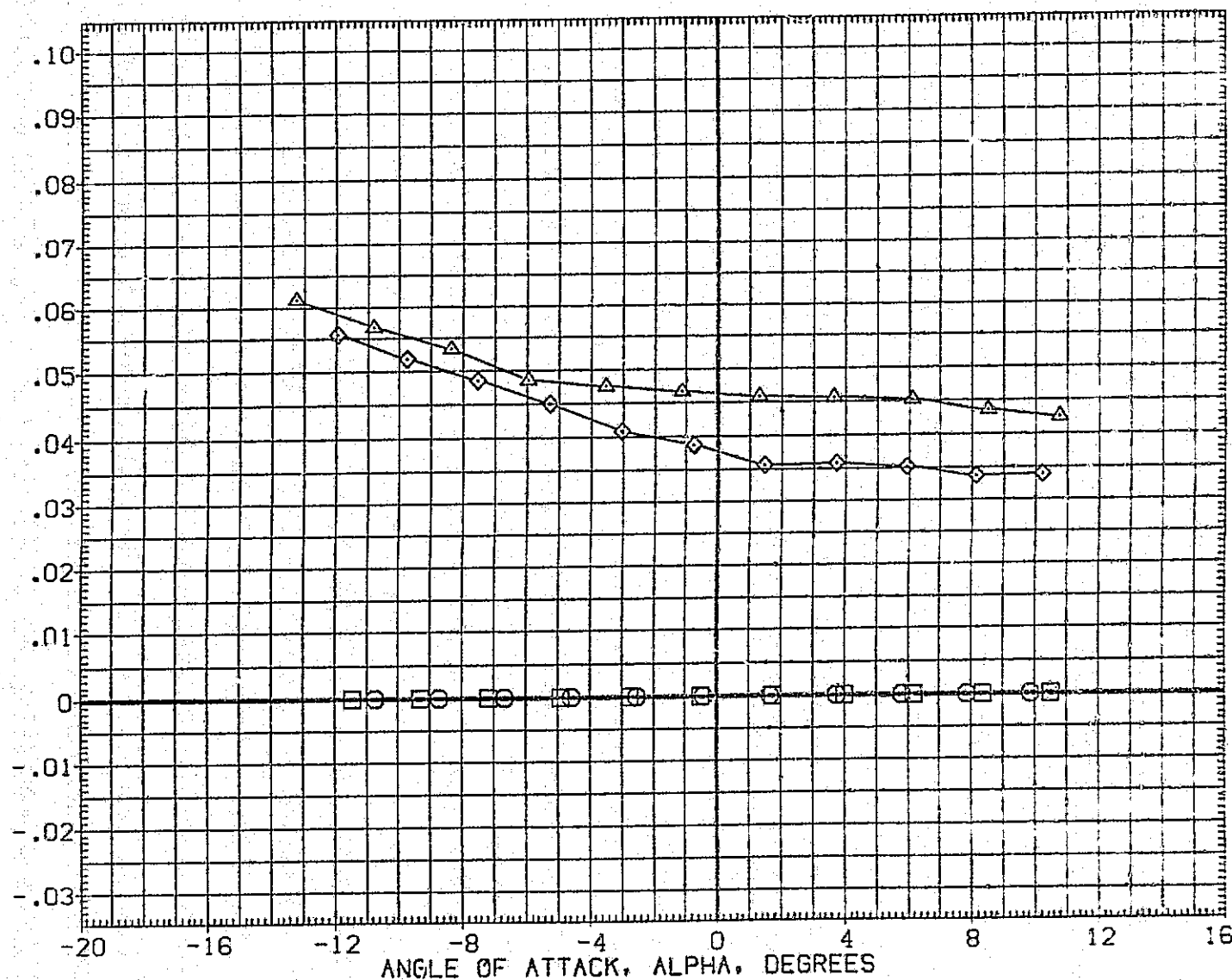


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	DATA NOT AVAILABLE
(AIC004)	DATA NOT AVAILABLE
(AIC005)	DATA NOT AVAILABLE
(AIC007)	MSFC 594(1A33) 740TS (TIPIS1P201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SD, FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

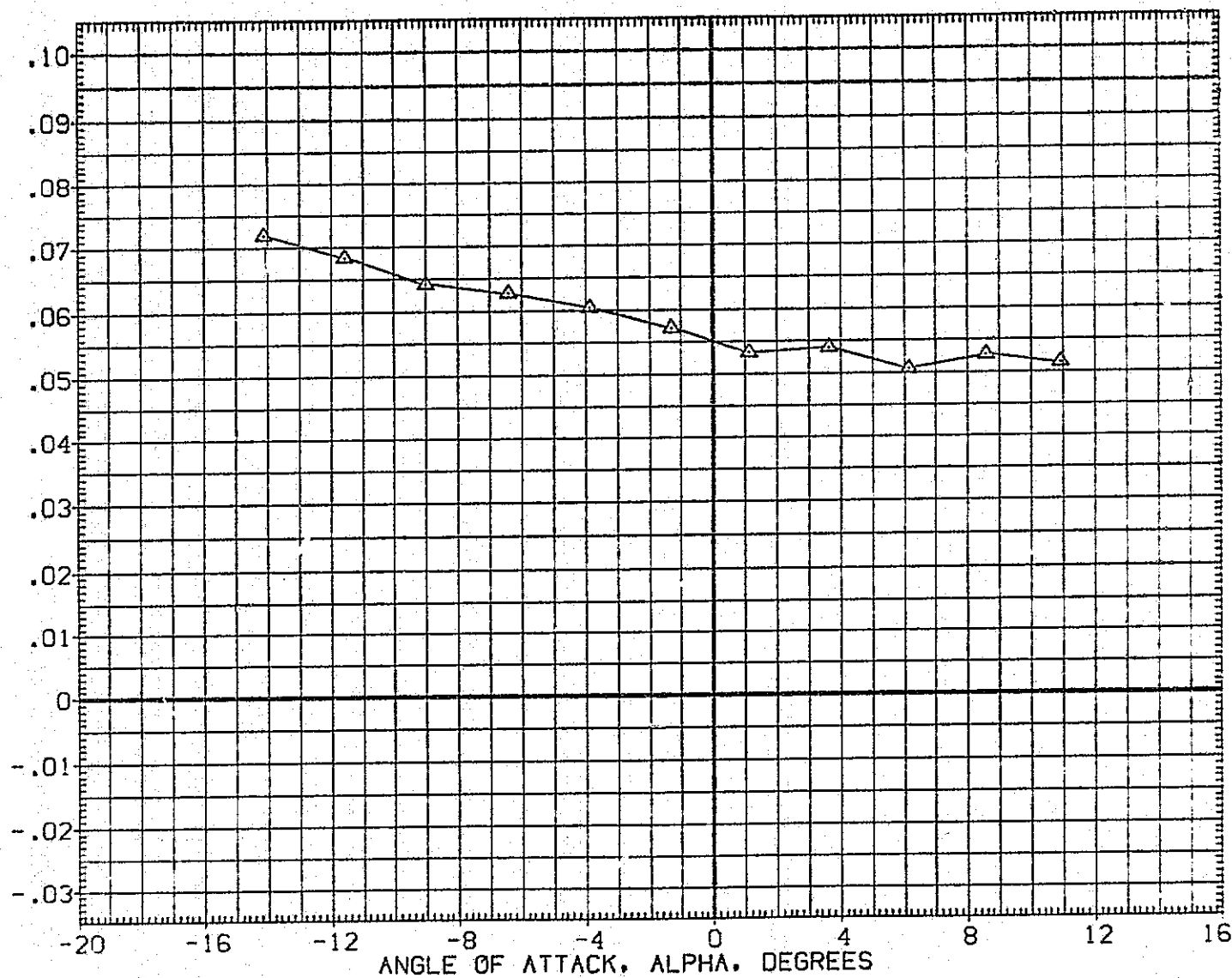


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (D)MACH 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C001)	MSFC 594(1A33) 740TS (TIP1)
(A1C004)	MSFC 594(1A33) 740TS (TIP1SIP2)
(A1C005)	MSFC 594(1A33) 740TS (TIP101)
(A1C007)	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{ABO}

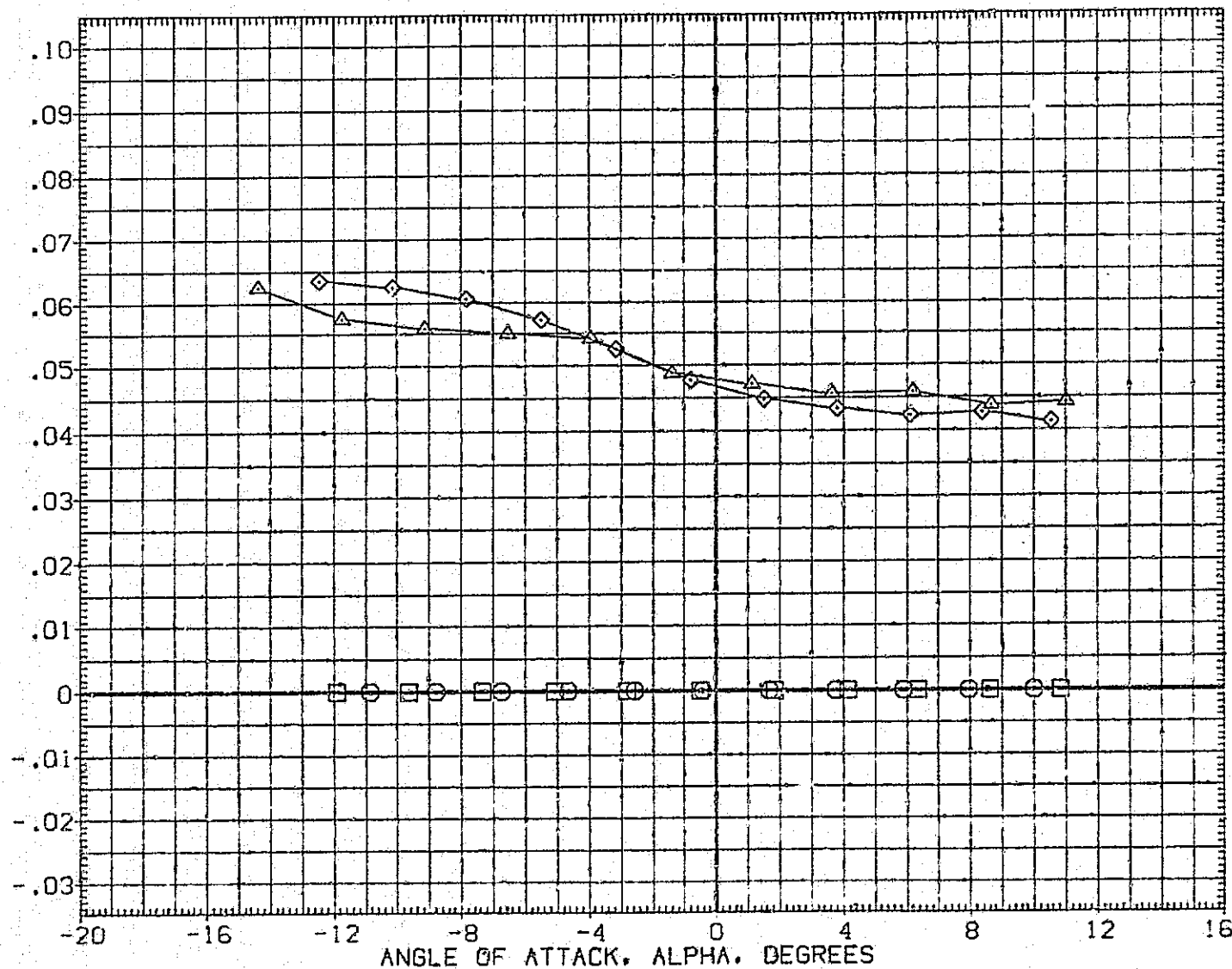


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	MSFC 594(1A33) 740TS (TIP1)
(AIC004)	MSFC 594(1A33) 740TS (TIP1SIP2)
(AIC005)	MSFC 594(1A33) 740TS (TIP101)
(AIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

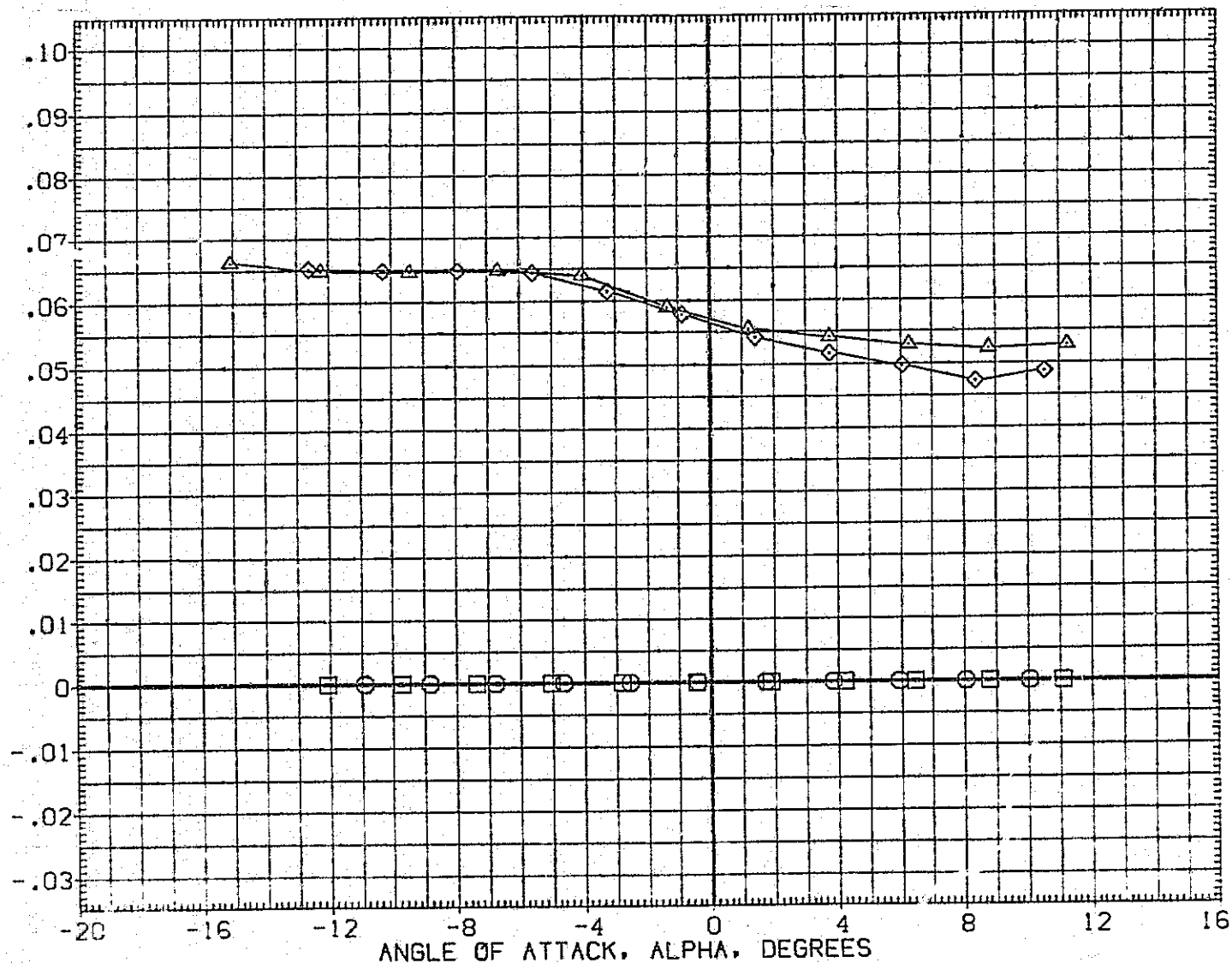


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(F)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
[AIC001]	DATA NOT AVAILABLE
[AIC004]	DATA NOT AVAILABLE
[AIC005]	DATA NOT AVAILABLE
[AIC007]	MSFC S94(A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, CABO

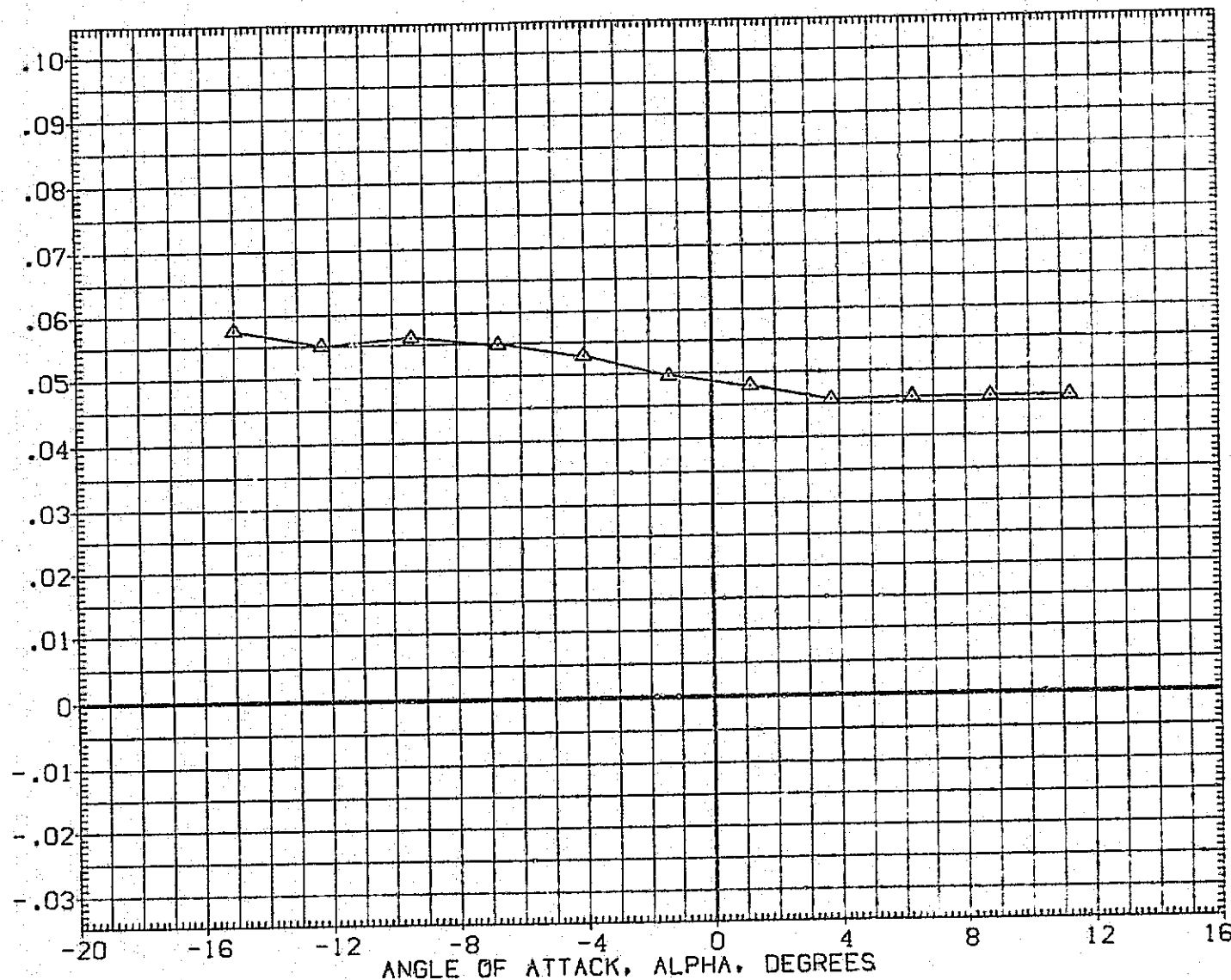


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (G)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	MSFC 594(A33) 740TS (TIP1)
(AIC004)	MSFC 594(A33) 740TS (TIPISIP2)
(AIC005)	MSFC 594(A33) 740TS (TIP101)
(AIC007)	MSFC 594(A33) 740TS (TIPISIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

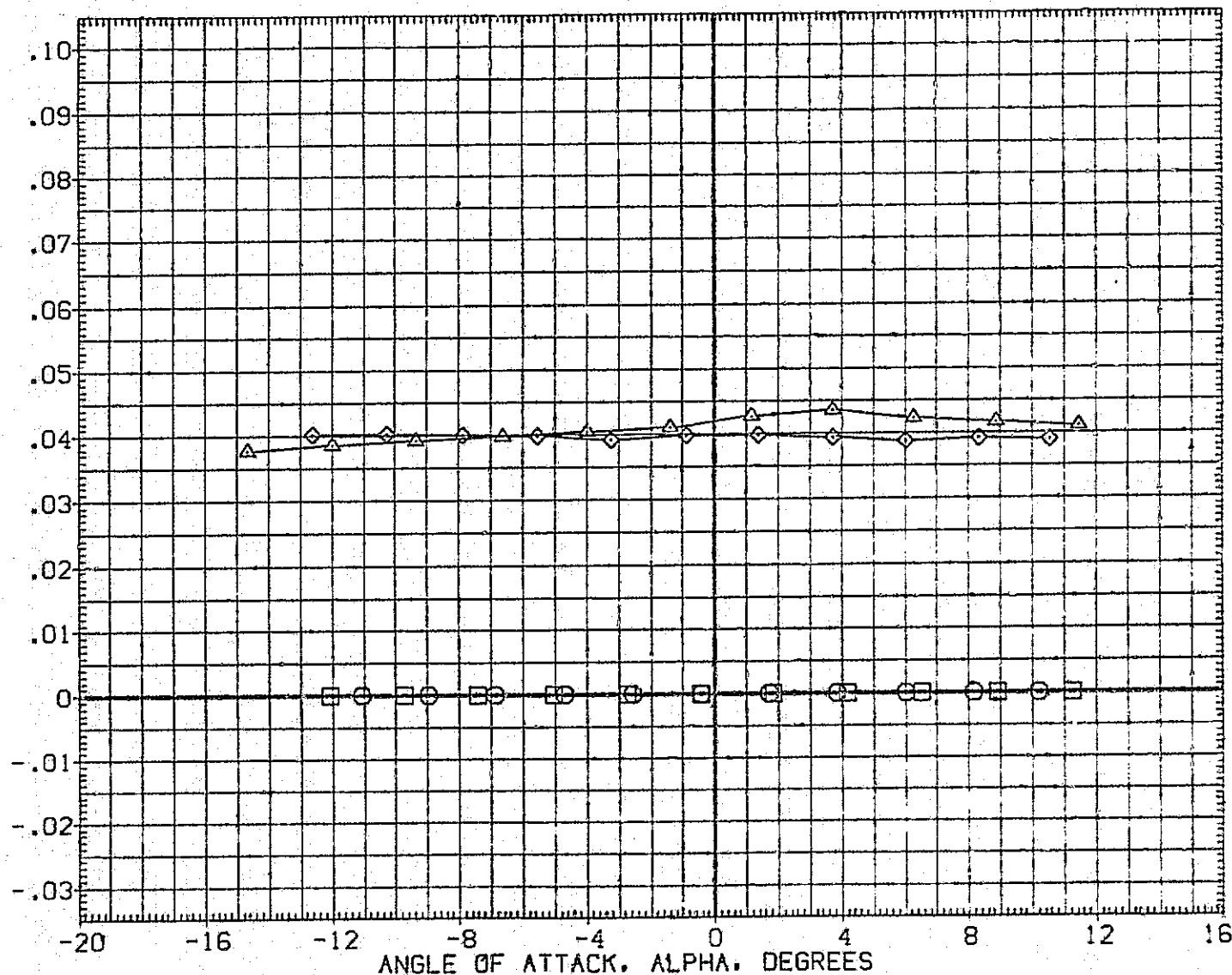


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(H)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	MSFC 594(1A33) 740TS (TIP1)
(AIC004)	MSFC 594(1A33) 740TS (TIP1P2)
(AIC005)	MSFC 594(1A33) 740TS (TIP1Q1)
(AIC007)	MSFC 594(1A33) 740TS (TIP1P2Q1)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

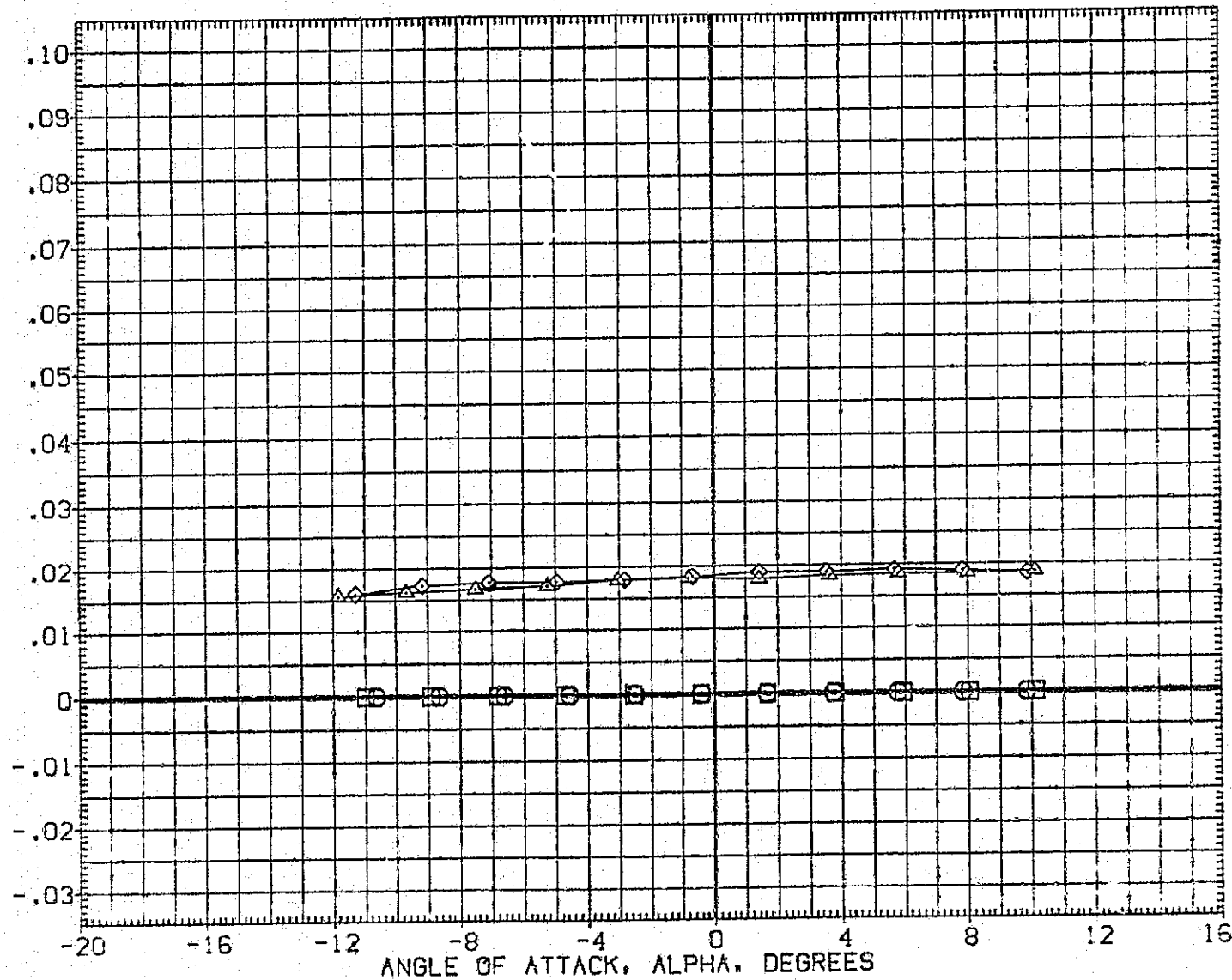


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (1)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC001)	MSFC 594(A33) 740TS (TIP1)
(AIC004)	MSFC 594(A33) 740TS (TIP1SIP2)
(AIC005)	MSFC 594(A33) 740TS (TIP101)
(AIC007)	MSFC 594(A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AS0}

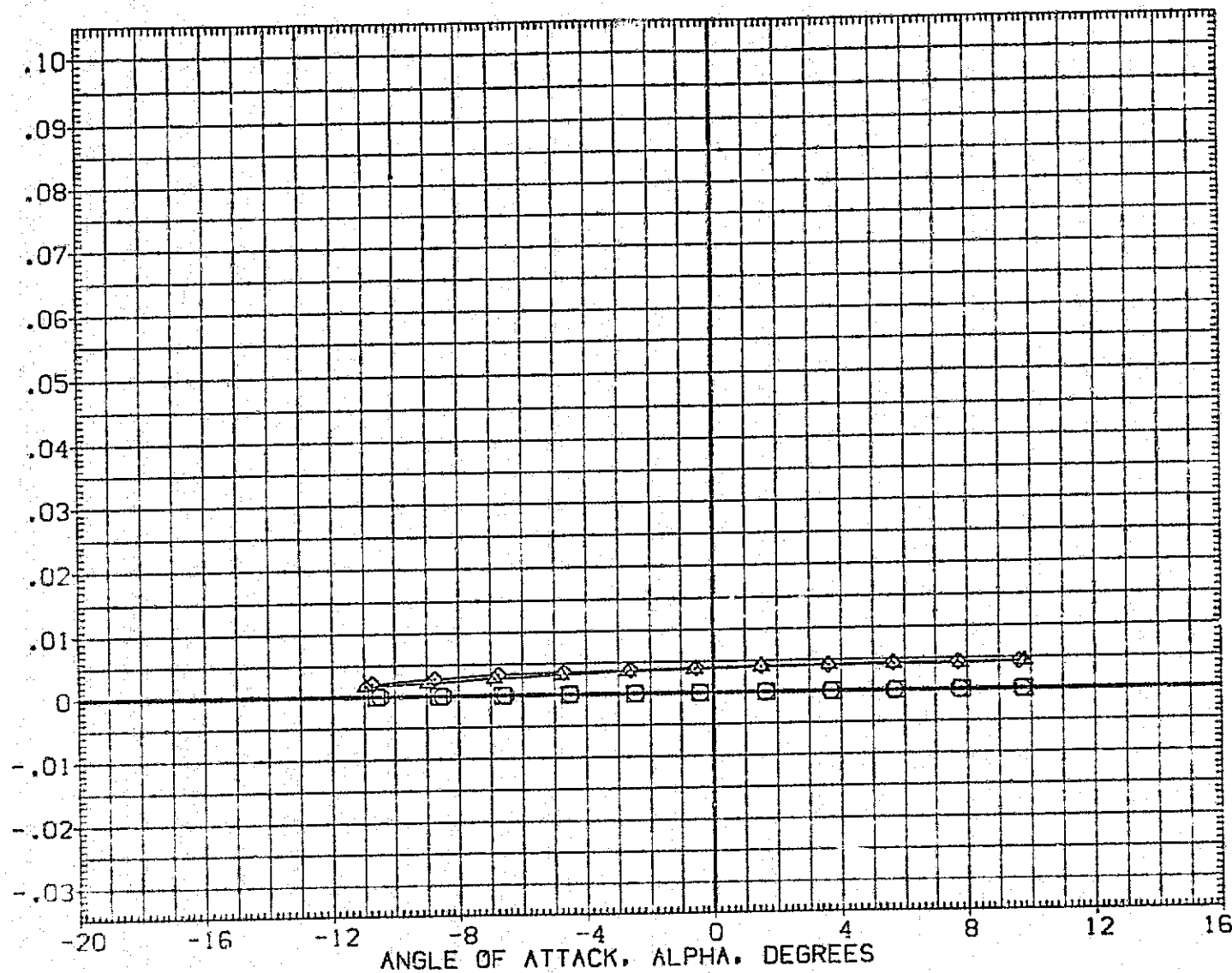


FIG 4 CONFIGURATION BUILDUP-EFFECT ON LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC002)	MSFC 594(1A33) 740TS (TIP1)
(AIC003)	MSFC 594(1A33) 740TS (TIP1SIP2)
(AIC006)	MSFC 594(1A33) 740TS (TIP101)
(AIC008)	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

SIDE-FORCE COEFFICIENT, CY

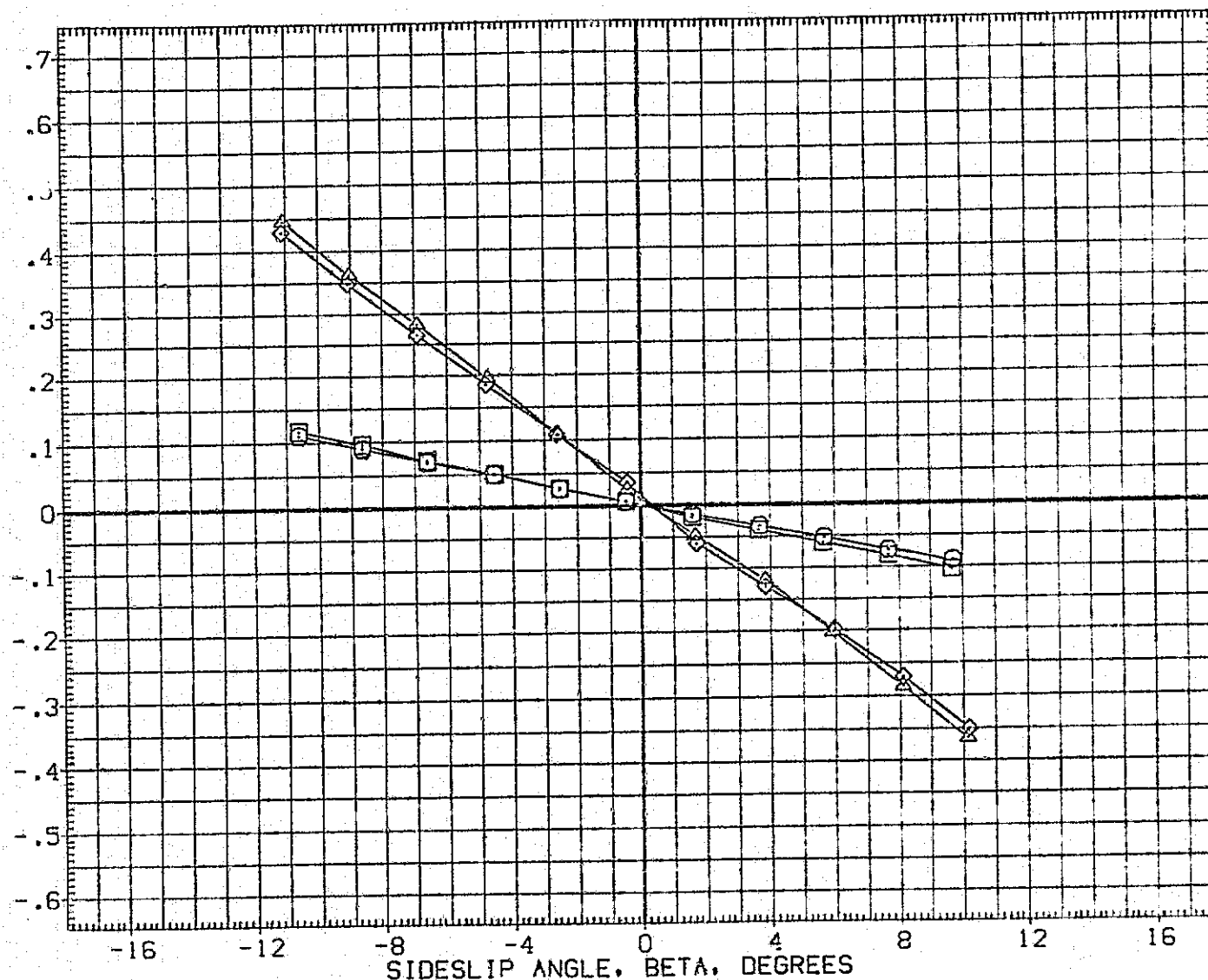


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (A)MACH = .60

DATA SET SYMBOL CONFIGURATION DESCRIPTION

[A1C002] □ DATA NOT AVAILABLE
 [A1C003] □ DATA NOT AVAILABLE
 [A1C006] □ DATA NOT AVAILABLE
 [A1C008] △ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SIDE-FORCE COEFFICIENT, CY

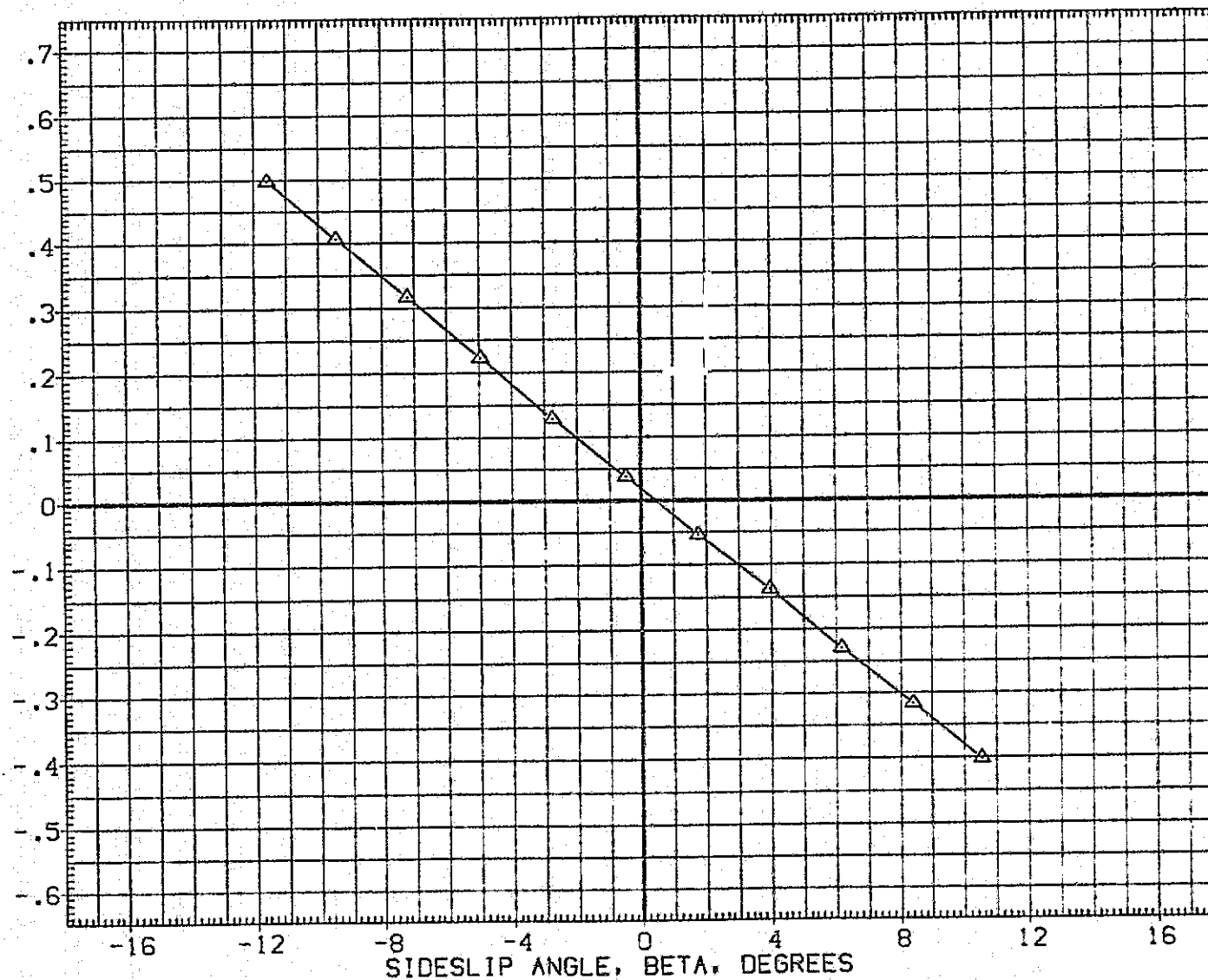


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C002)	MSFC 594(1A33) 740TS (TIP1)
(A1C003)	MSFC 594(1A33) 740TS (TIP1SIP2)
(A1C006)	MSFC 594(1A33) 740TS (TIP101)
(A1C008)	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

SIDE-FORCE COEFFICIENT, CY

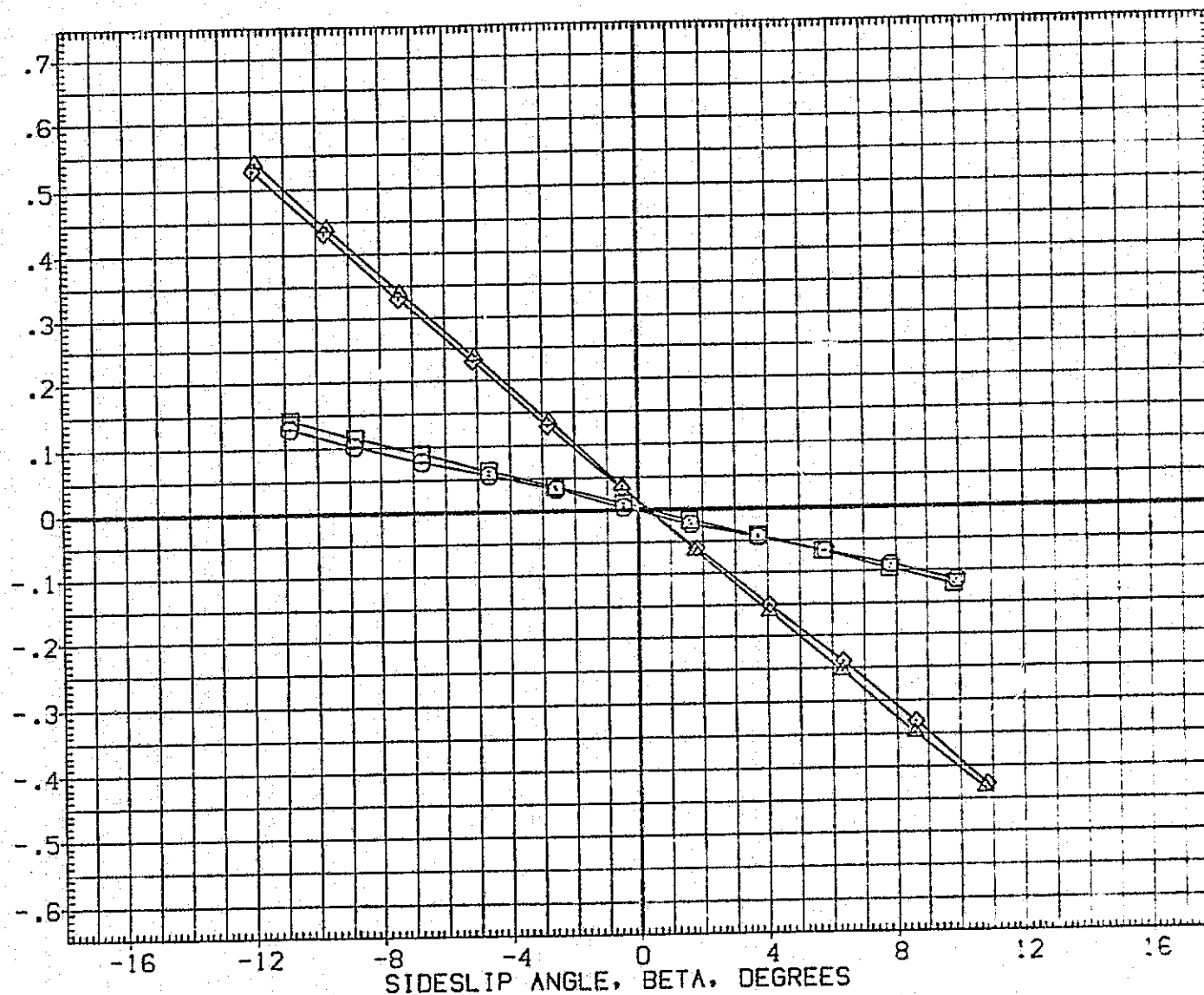


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
(C)MACH = .90

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(AIC002) DATA NOT AVAILABLE
 (AIC003) DATA NOT AVAILABLE
 (AIC006) DATA NOT AVAILABLE
 (AIC008) MSFC 594(1A33) 740TS (TIP1SIP201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 975.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SIDE-FORCE COEFFICIENT, CY

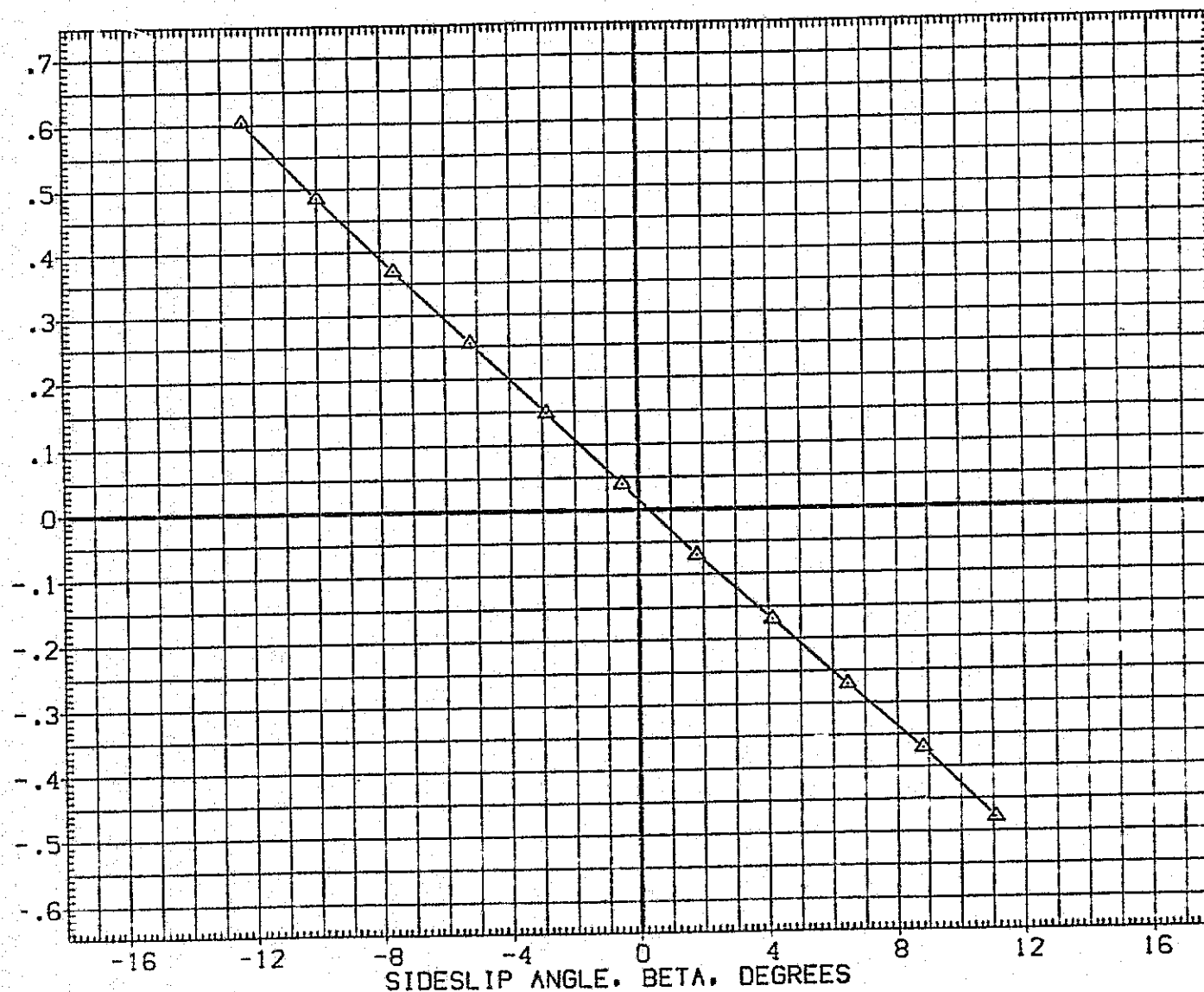


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C002)	MSFC 594(A33) 740TS (TIP1)
(A1C003)	MSFC 594(A33) 740TS (TIP1SIP2)
(A1C005)	MSFC 594(A33) 740TS (TIP101)
(A1C008)	MSFC 594(A33) 740TS (TIP1SIP201)

ET STING	ORB STING
ET STING	ORB STING

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

SIDE-FORCE COEFFICIENT, CY

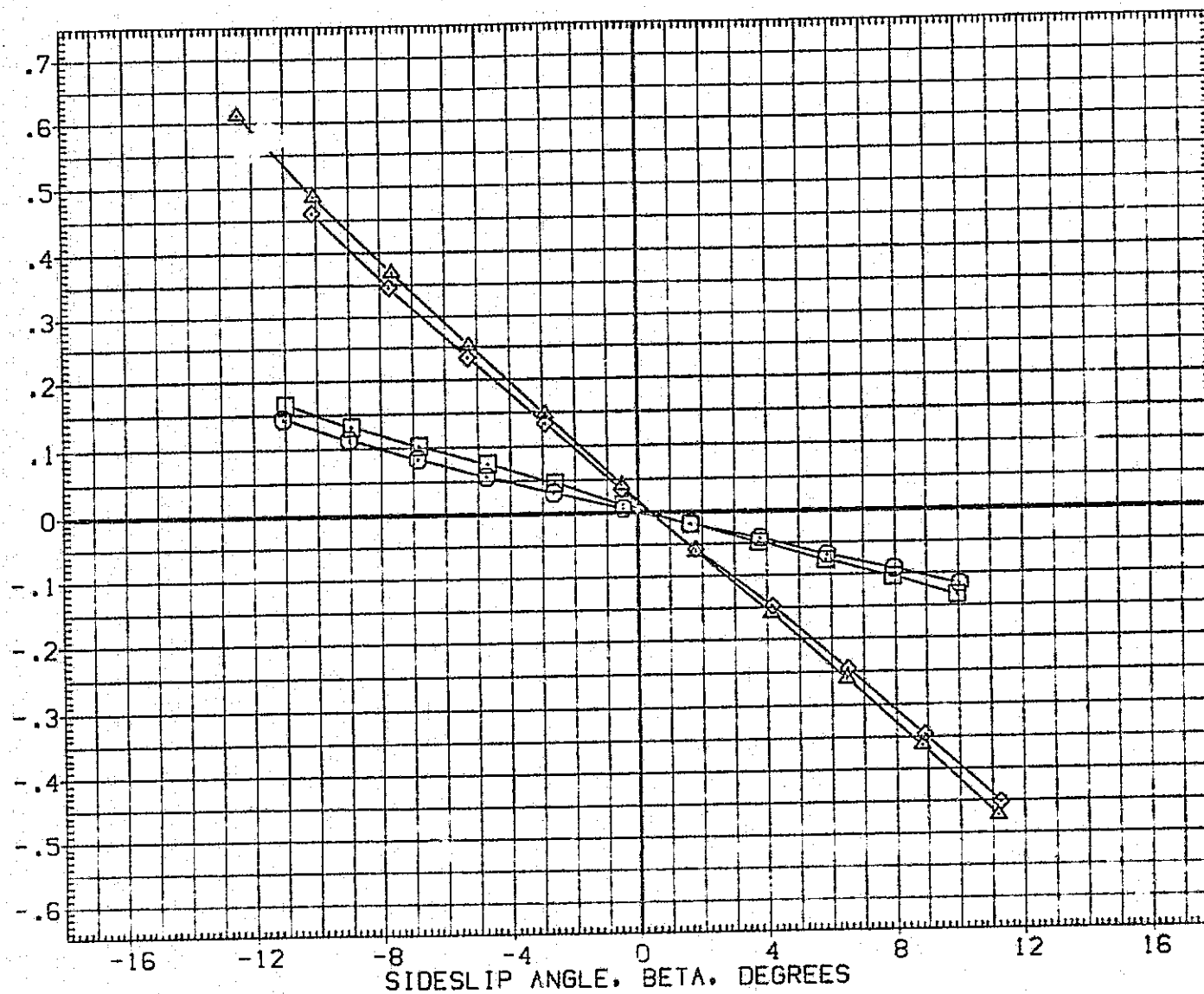


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC002)	MSFC 594(1A33) 740TS (TIP1)
(AIC003)	MSFC 594(1A33) 740TS (TIP1P2)
(AIC006)	MSFC 594(1A33) 740TS (TIP1P1)
(AIC008)	MSFC 594(1A33) 740TS (TIP1P201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

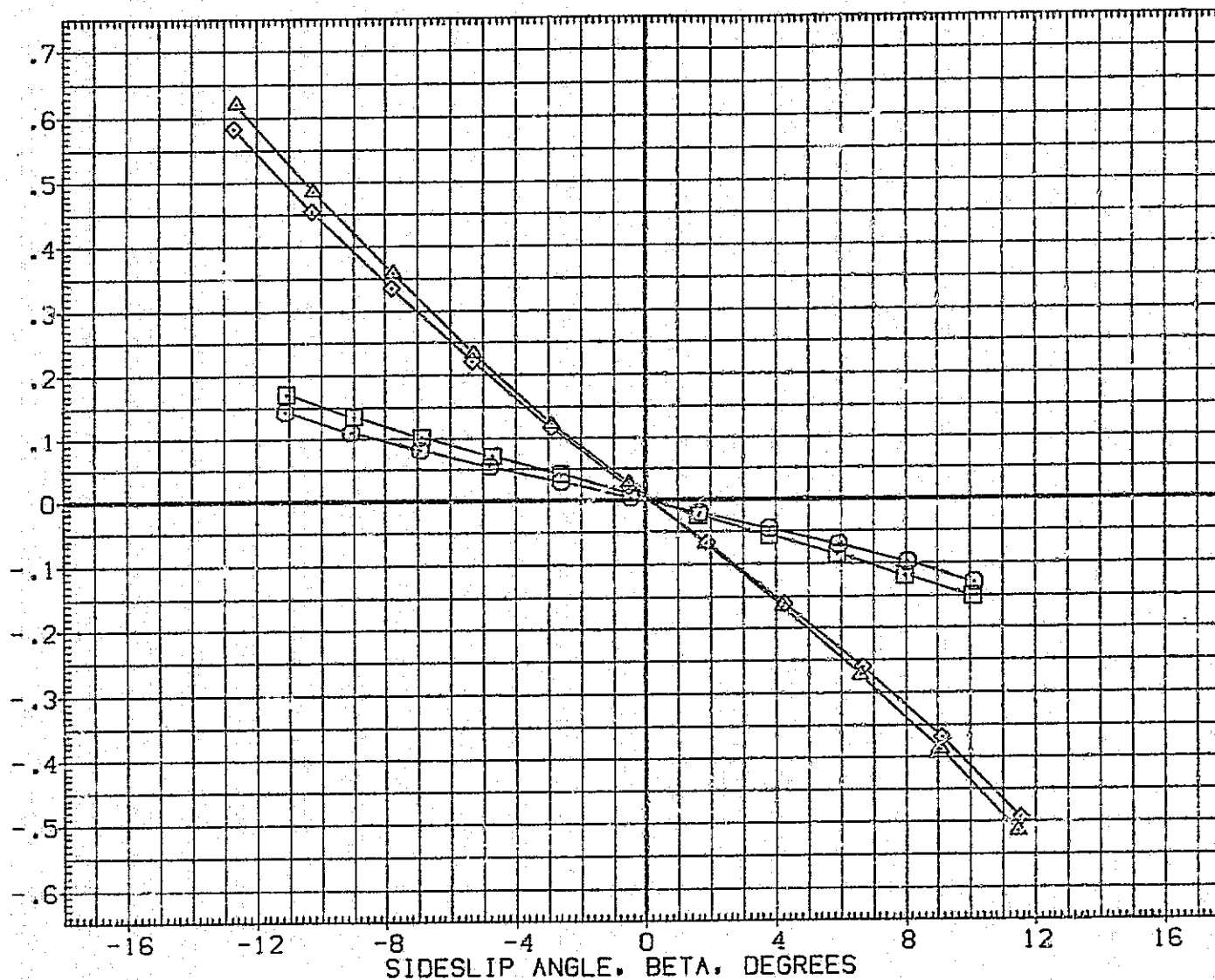


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (F)MACH = 1.25

DATA SET SYMBOL CONFIGURATION DESCRIPTION

[A1C002] DATA NOT AVAILABLE

[A1C003] DATA NOT AVAILABLE

[A1C006] DATA NOT AVAILABLE

[A1C008] MSFC S94(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT

LREF 1290.0000 IN.

BREF 1290.0000 IN.

XMRP 976.0000 IN. XT

YMRP .0000 IN. YT

ZMRP 400.0000 IN. ZT

SCALE .0040

SIDE-FORCE COEFFICIENT, CY

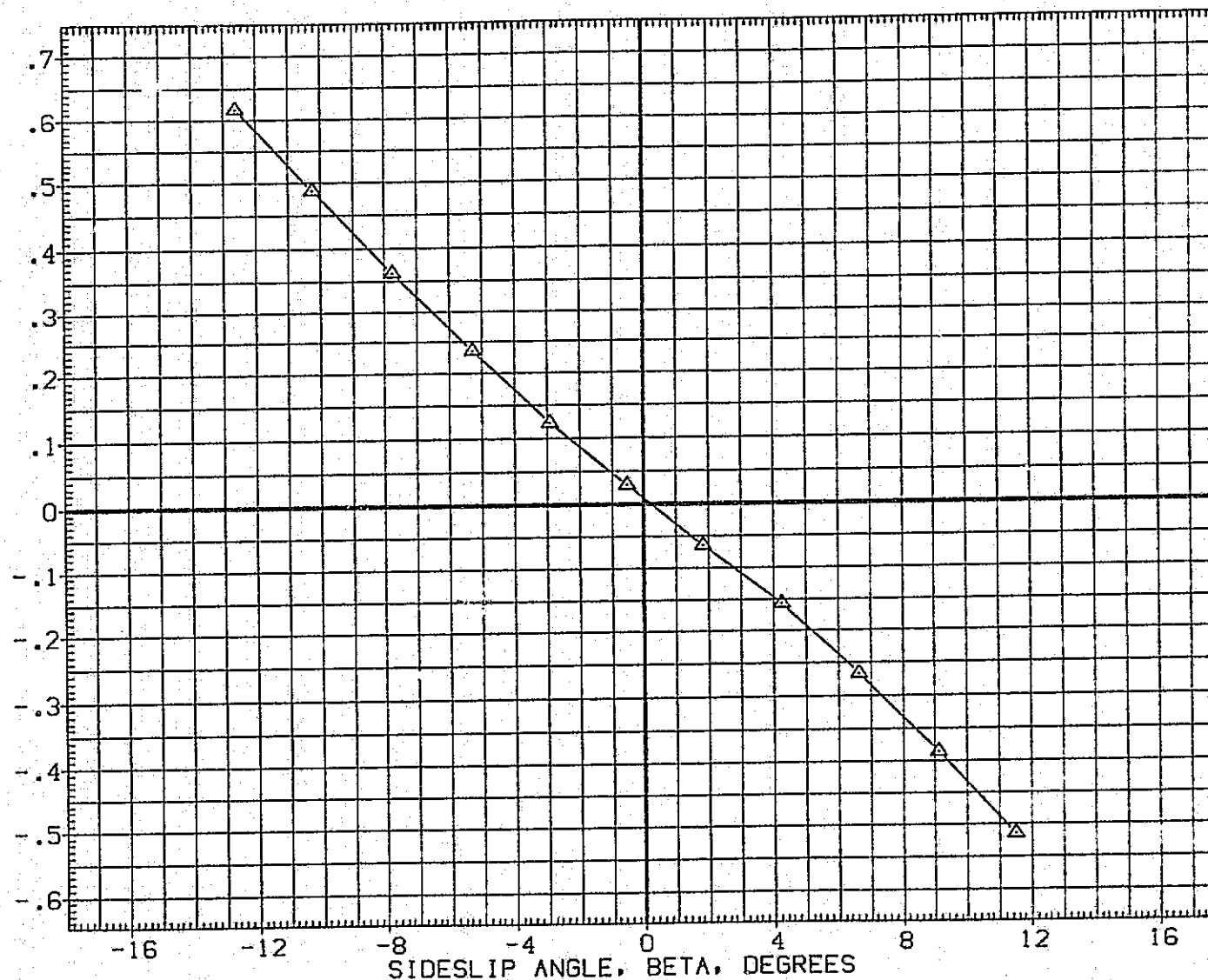


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., $\alpha = 0$ DEG

(G)MACH = 1.47

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A)C002	MSFC S94(1A33) 740TS (TIP1)
(A)C003	MSFC S94(1A33) 740TS (TIP1SIP2)
(A)C006	MSFC S94(1A33) 740TS (TIP101)
(A)C008	MSFC S94(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

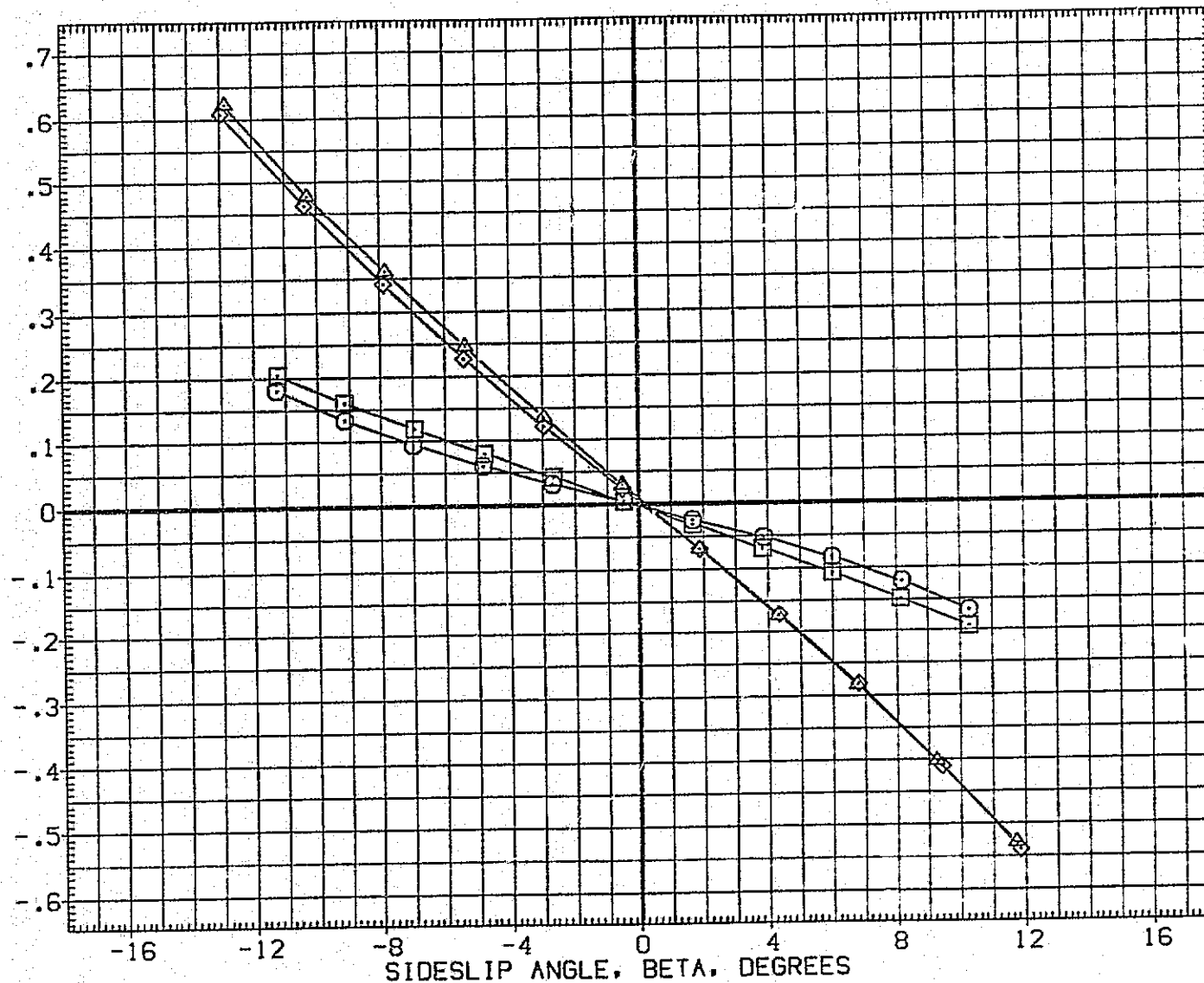


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., $\alpha = 0$ DEG
(H)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STRING
(AIC002)	MSFC 594(1A33) 740TS (TIP1)	ET STRING
(AIC003)	MSFC 594(1A33) 740TS (TIP1S1P2)	ET STRING
(AIC006)	MSFC 594(1A33) 740TS (TIP101)	ORB STRING
(AIC008)	MSFC 594(1A33) 740TS (TIP1S1P201)	ORB STRING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

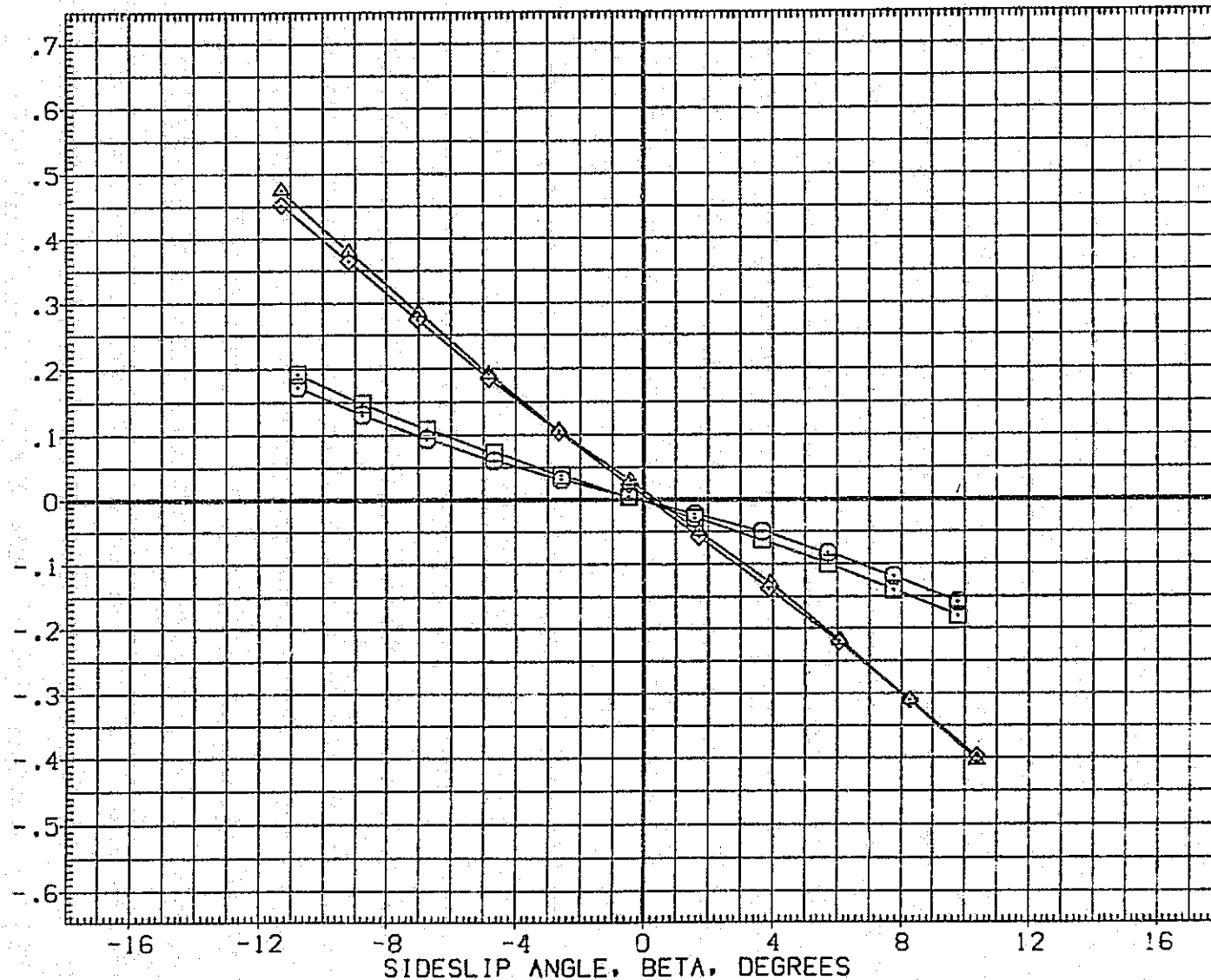


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (I)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(AIC002)	MSFC 594(A33) 740TS (TIP1)	ET STING
(AIC003)	MSFC 594(A33) 740TS (TIPISIP2)	ET STING
(AIC006)	MSFC 594(A33) 740TS (TIP101)	ORB STING
(AIC008)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

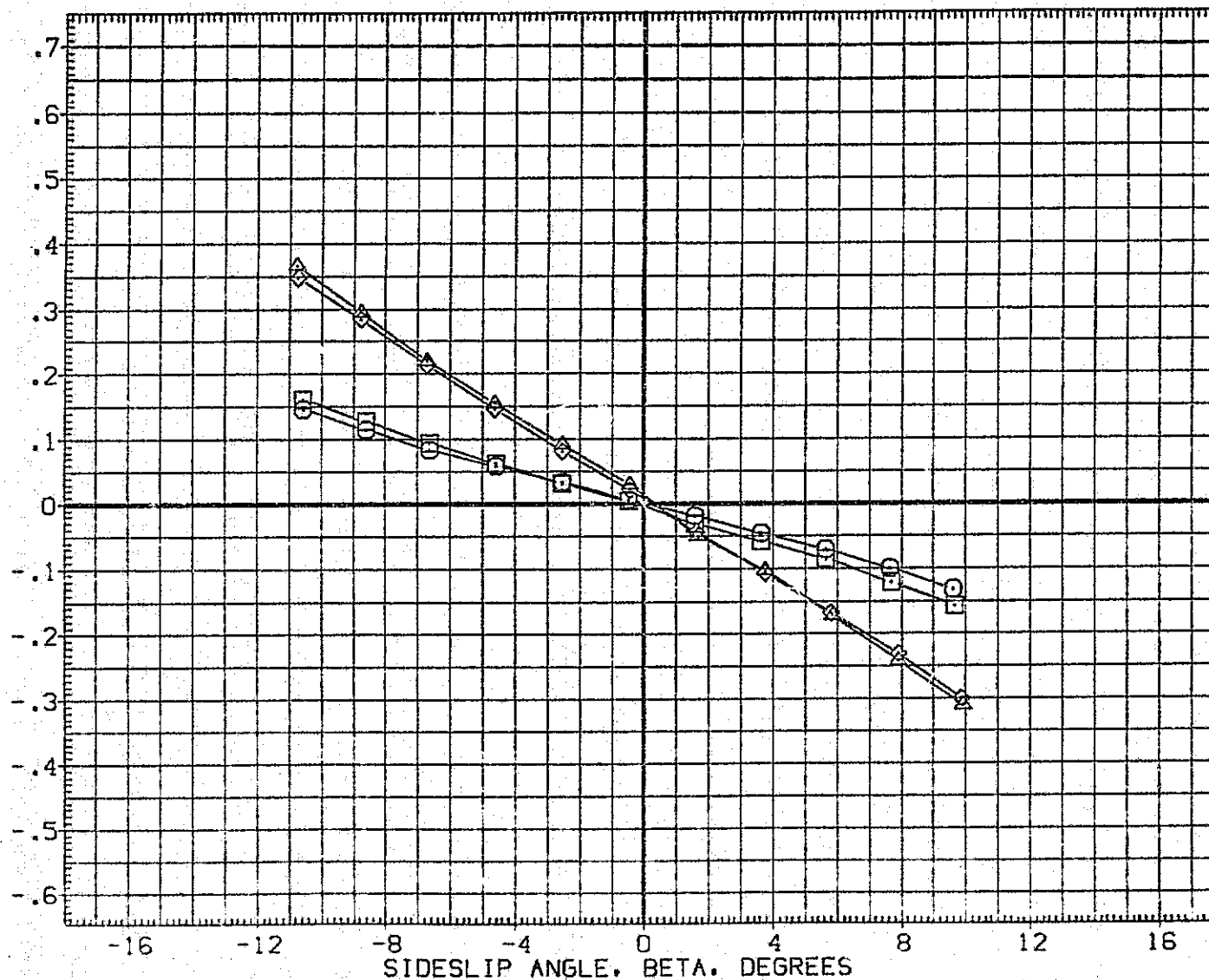


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
{A1C002}	MSFC 594(A33) 740TS (TIP1)
{A1C003}	MSFC 594(A33) 740TS (TIP1P2)
{A1C006}	MSFC 594(A33) 740TS (TIP101)
{A1C008}	MSFC 594(A33) 740TS (TIP1P201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

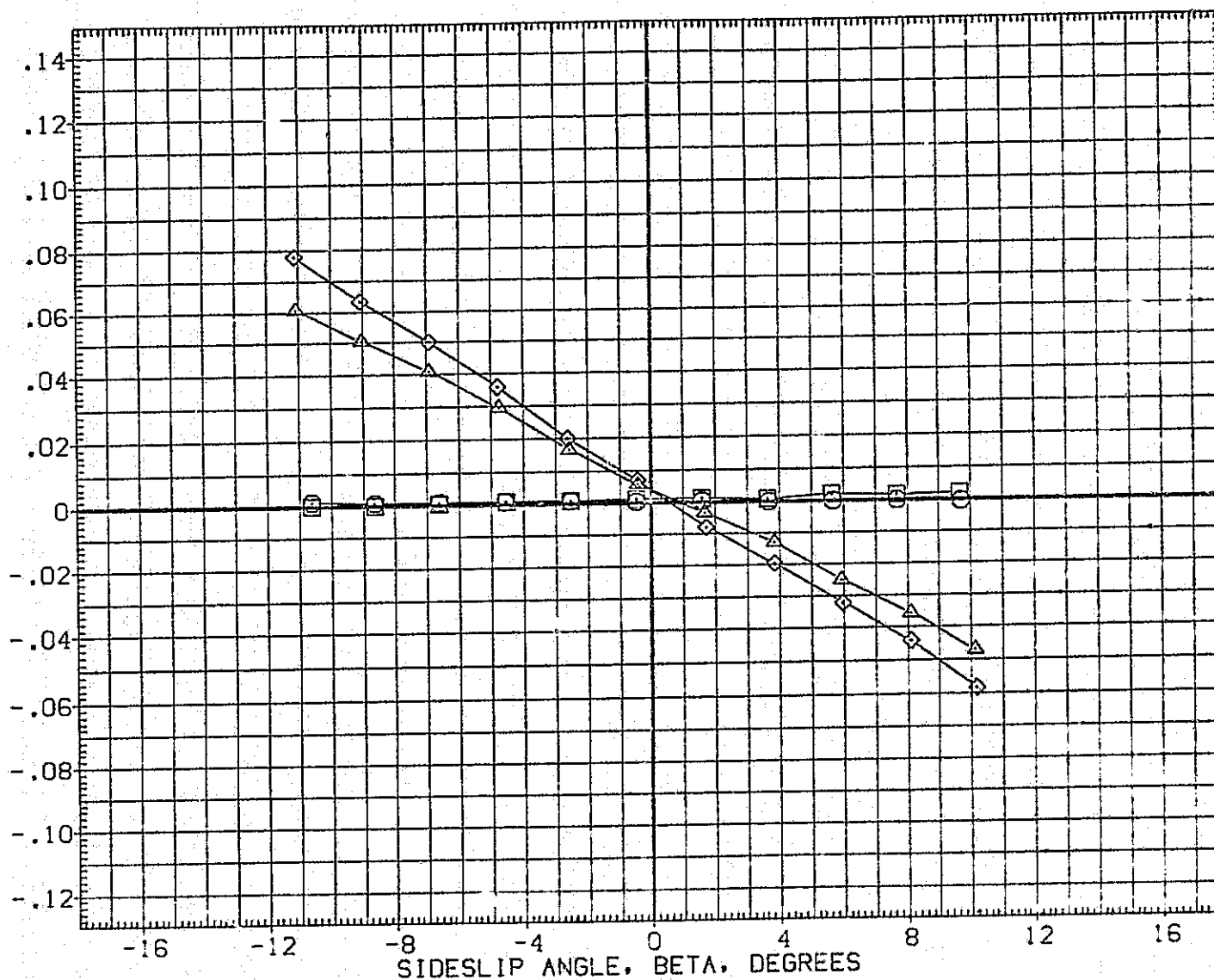


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC002)	DATA NOT AVAILABLE
(AIC003)	DATA NOT AVAILABLE
(AIC005)	DATA NOT AVAILABLE
(AIC008)	MSFC 584(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

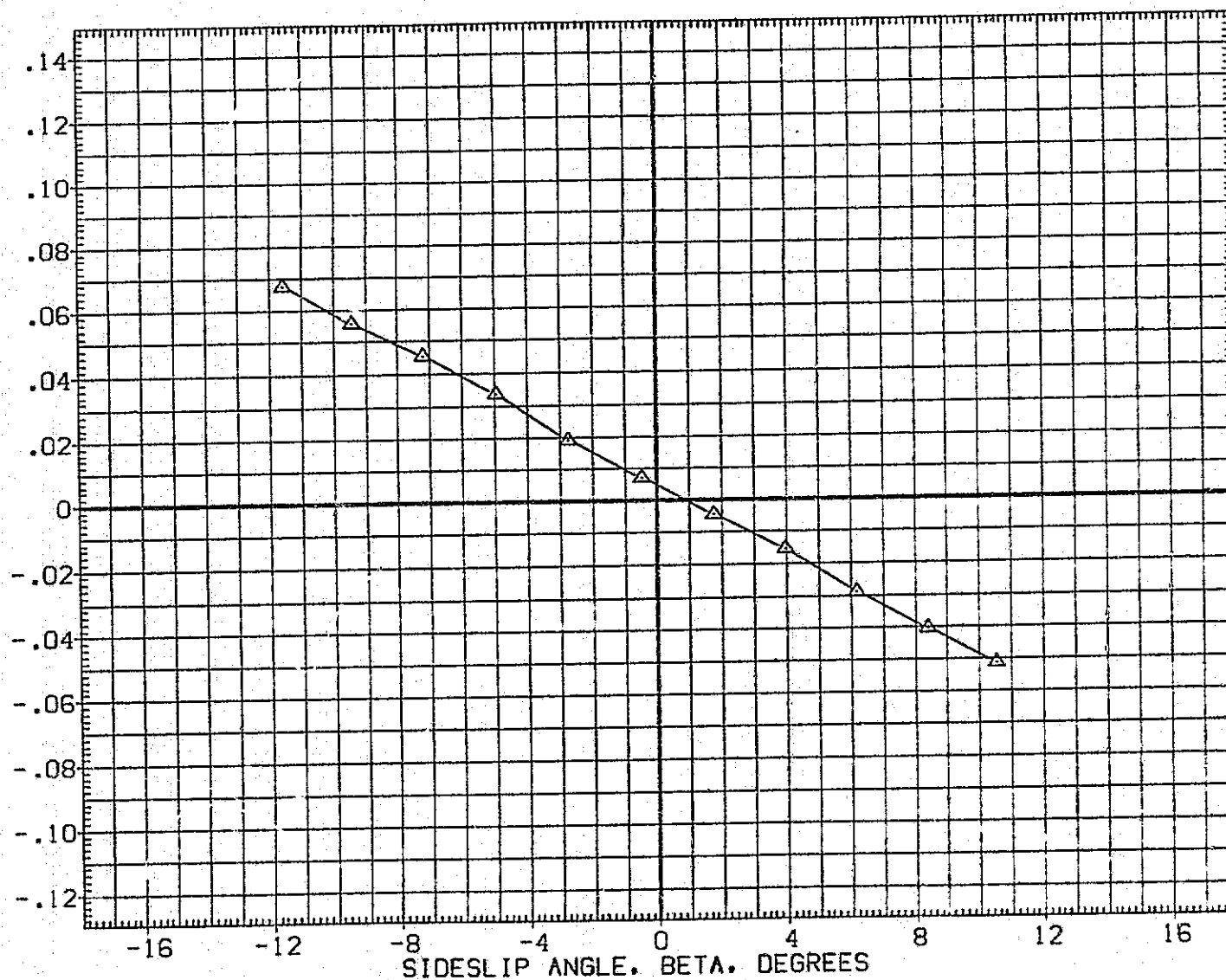


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(AIC002)	MSFC 594(1A33) 740TS (TIP1)	ET STING
(AIC003)	MSFC 594(1A33) 740TS (TIP1P2)	ET STING
(AIC006)	MSFC 594(1A33) 740TS (TIP101)	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (TIP1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

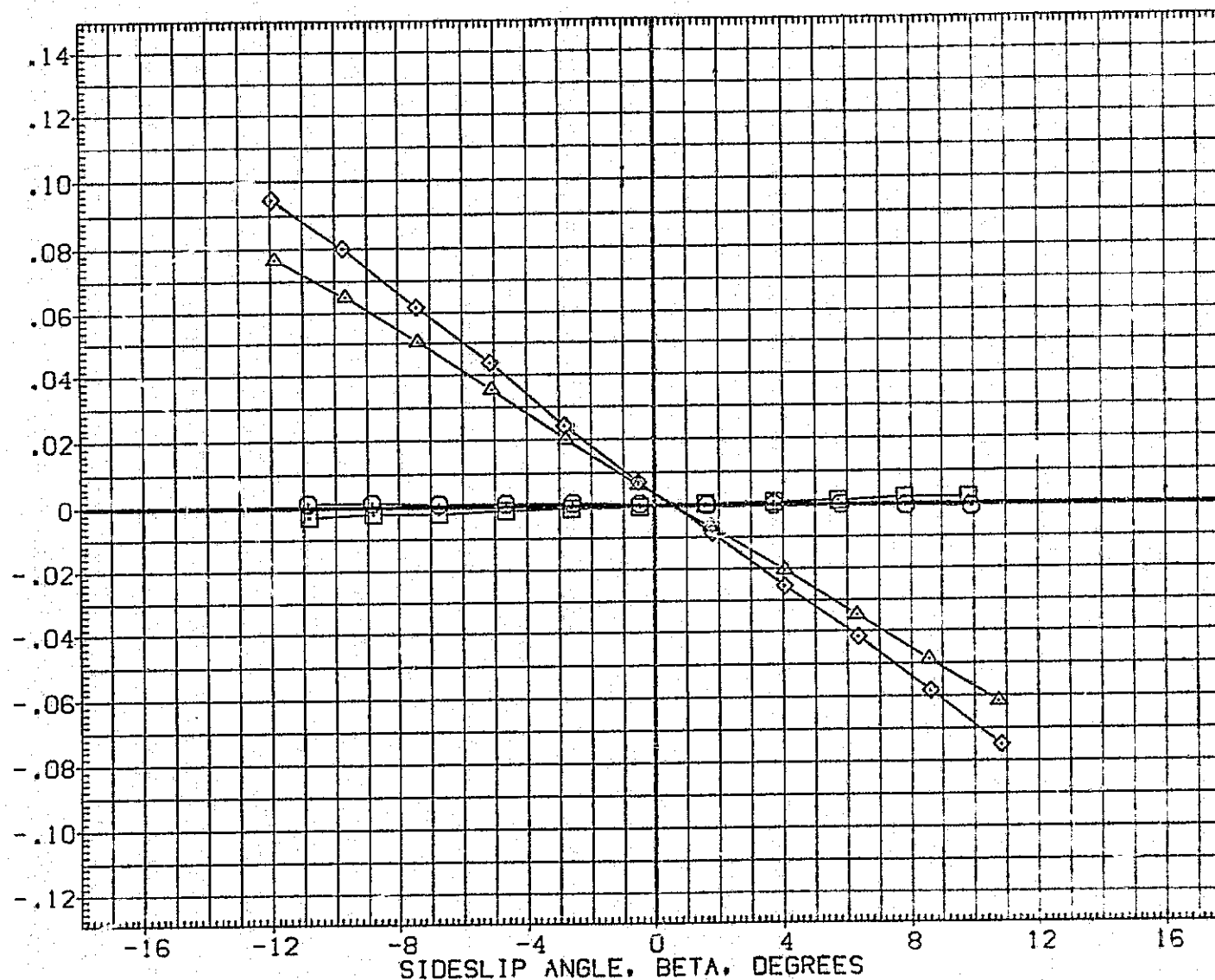


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC002)	DATA NOT AVAILABLE
(AIC003)	DATA NOT AVAILABLE
(AIC006)	DATA NOT AVAILABLE
(AIC008)	MSFC 594(1A33) 7-OTS (TIP(SIP201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

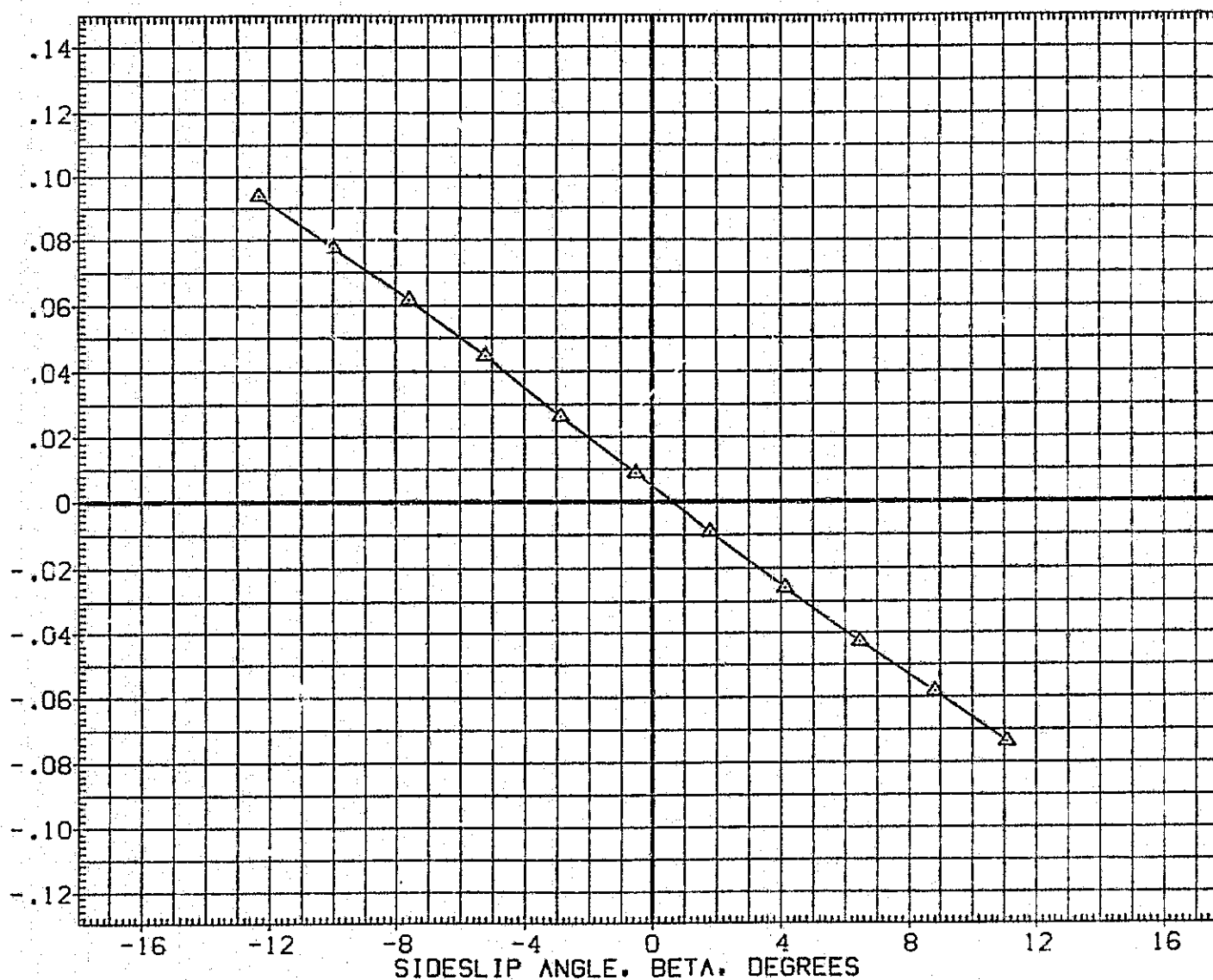


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC002)	MSFC 594(1A33) 740TS (TIP1)
(AIC003)	MSFC 594(1A33) 740TS (TIP1P2)
(AIC006)	MSFC 594(1A33) 740TS (TIP01)
(AIC008)	MSFC 594(1A33) 740TS (TIP1P201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

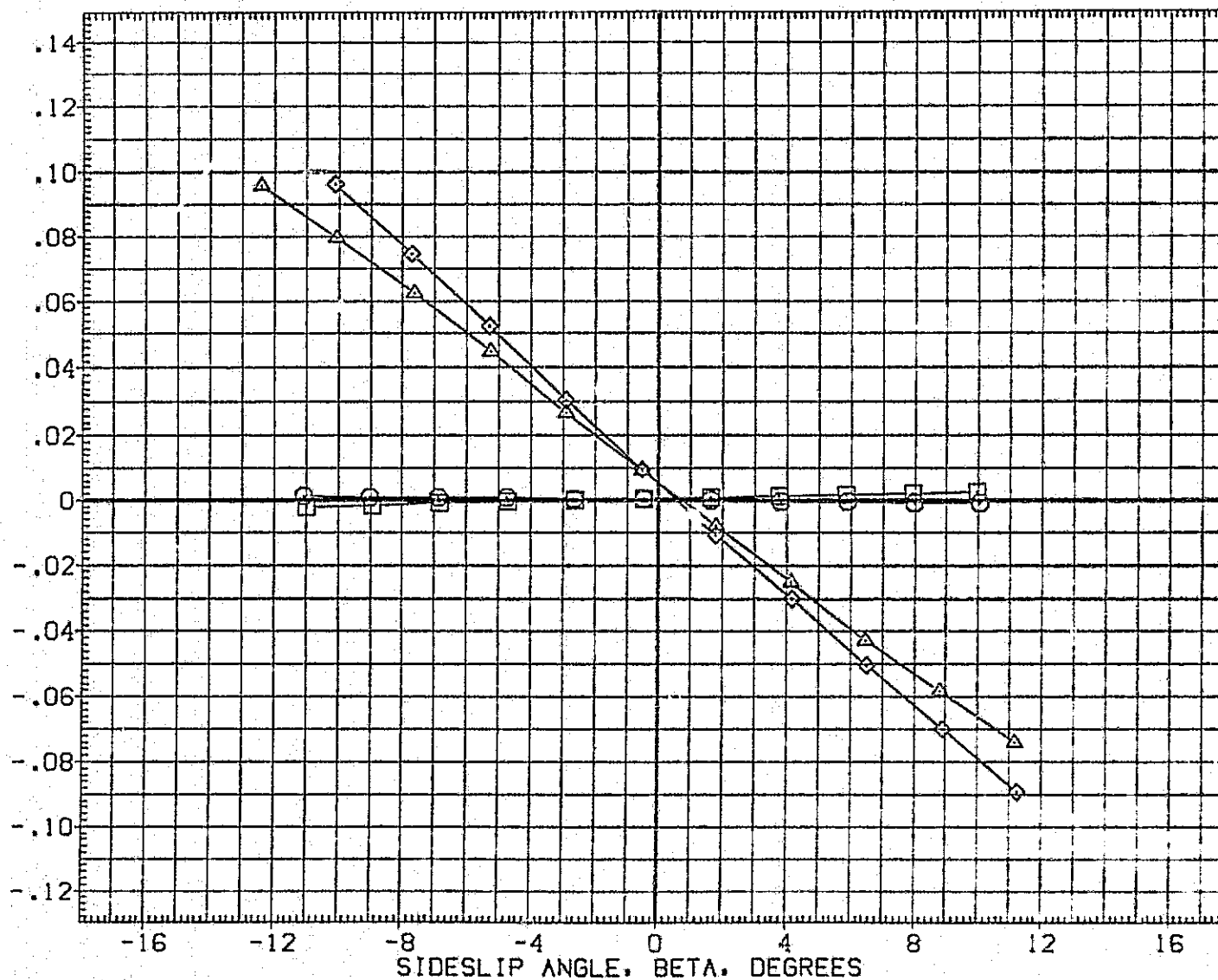


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG

(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(AIC002)	MSFC 594(1A33) 740TS (TIP1)	ET STING
(AIC003)	MSFC 594(1A33) 740TS (TIP1SIP2)	ET STING
(AIC006)	MSFC 594(1A33) 740TS (TIP101)	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

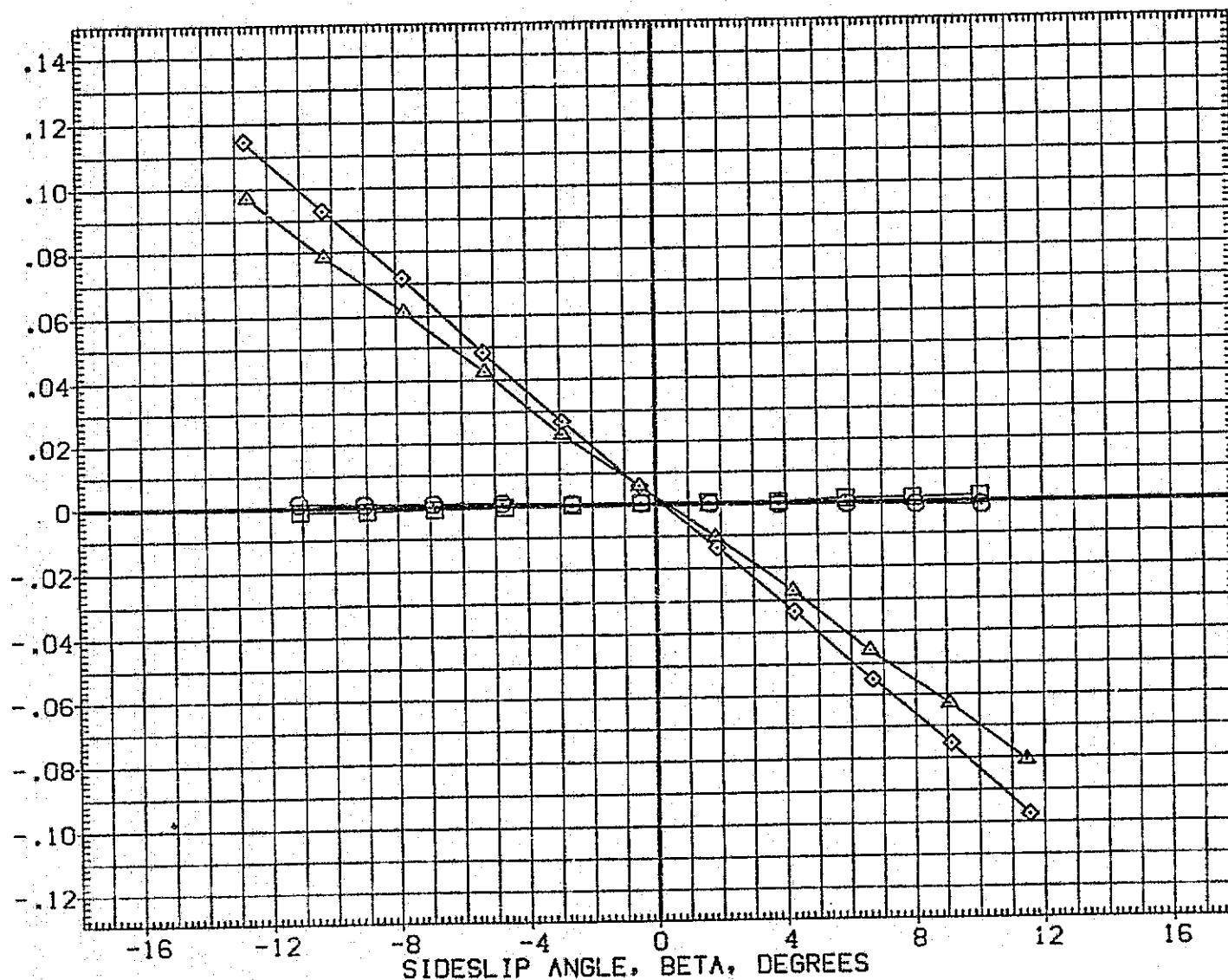


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
(F)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C002)	DATA NOT AVAILABLE
(A1C003)	DATA NOT AVAILABLE
(A1C006)	DATA NOT AVAILABLE
(A1C008)	MSFC 594(1A33) 740TS (TIP1SIP201)

ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SD. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0010	

ROLLING MOMENT COEFFICIENT, CBL

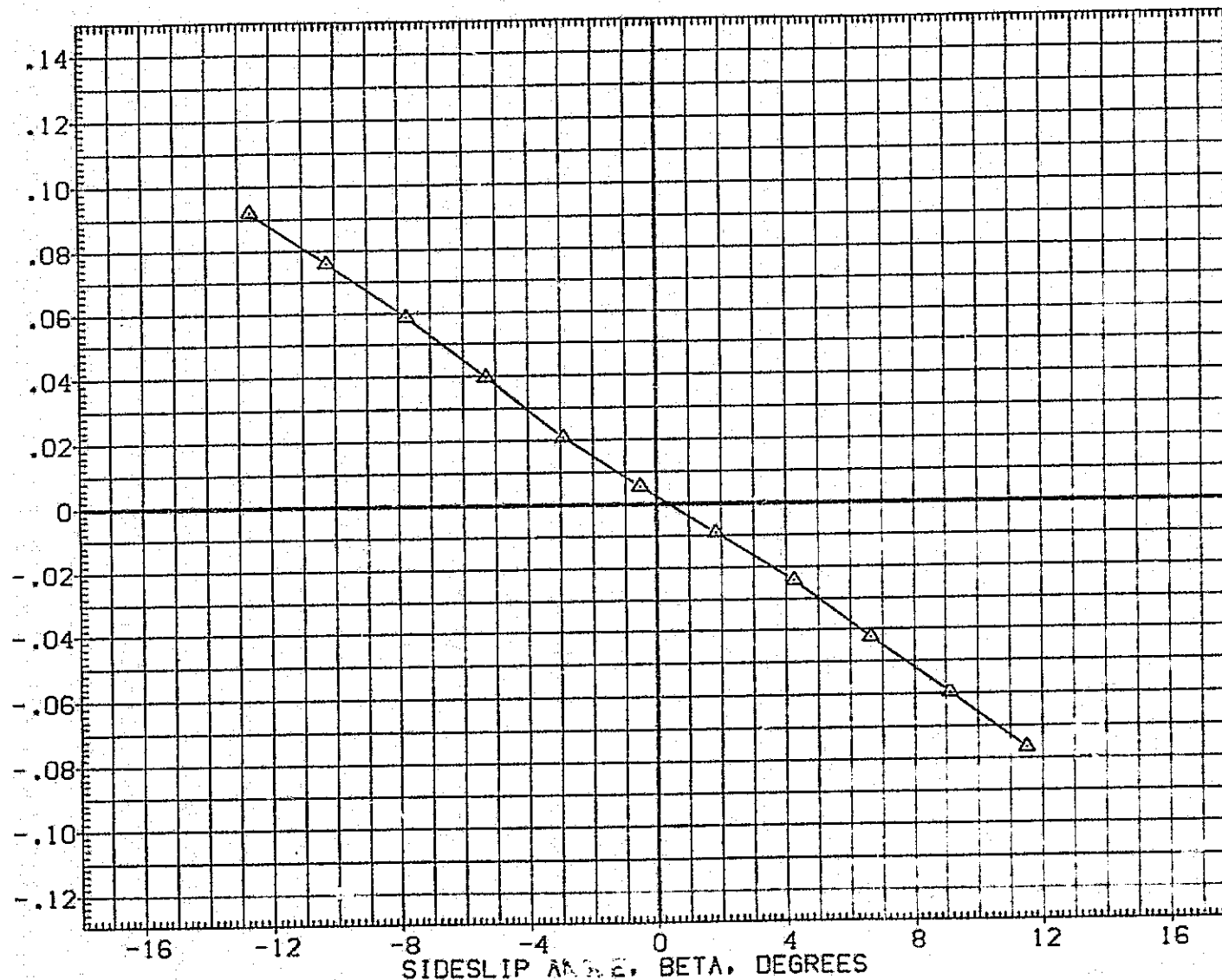


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (G)MACH = 1.47

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC002)	MSFC 594(1A33) 740TS (TIP1)
(AIC003)	MSFC 594(1A33) 740TS (TIP1SIP2)
(AIC006)	MSFC 594(1A33) 740TS (TIP101)
(AIC008)	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

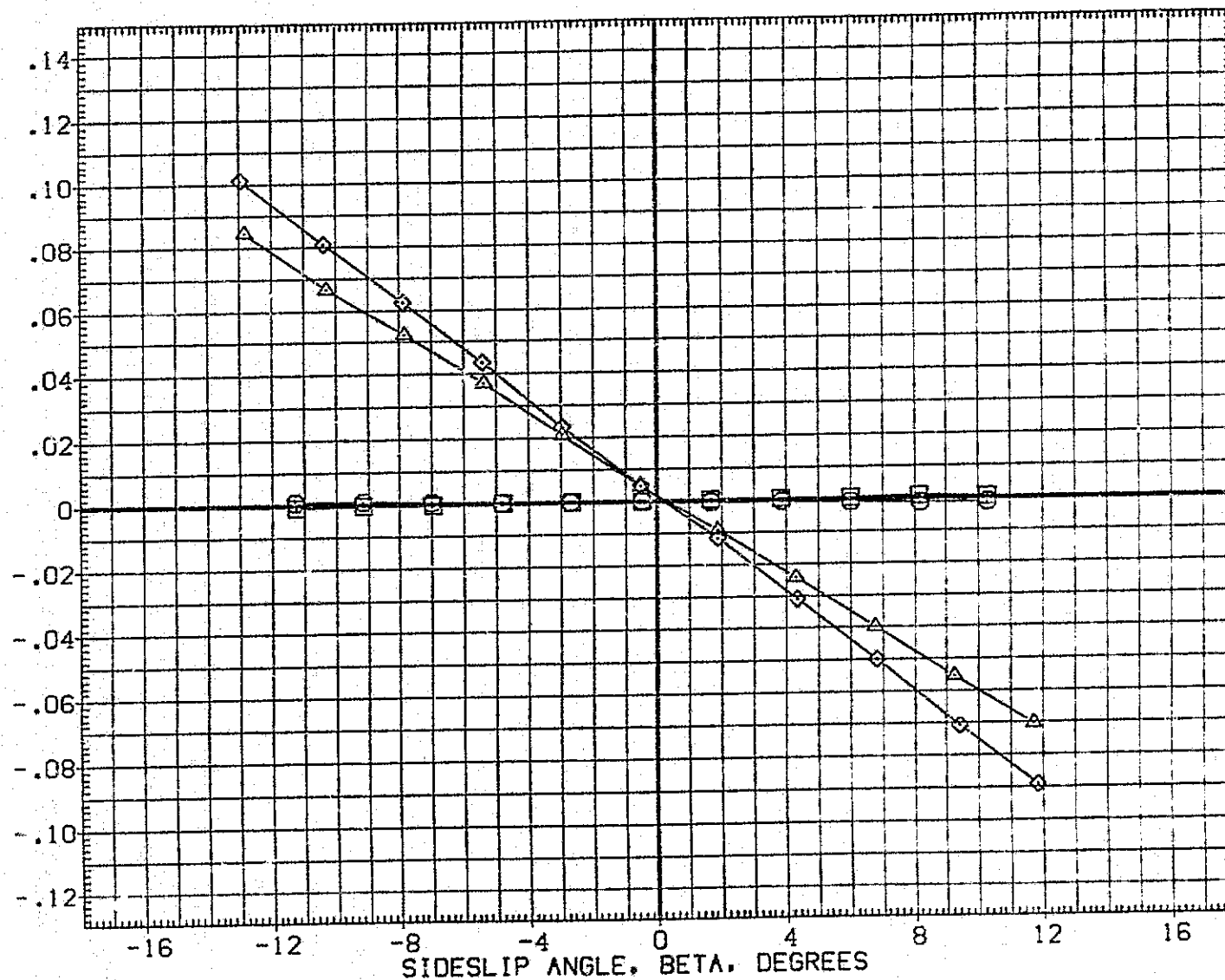


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
(H)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC002)	MSFC 594(A33) 740TS (TIP1)
(AIC003)	MSFC 594(A33) 740TS (TIPISIP2)
(AIC006)	MSFC 594(A33) 740TS (TIP101)
(AIC008)	MSFC 594(A33) 740TS (TIPISIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

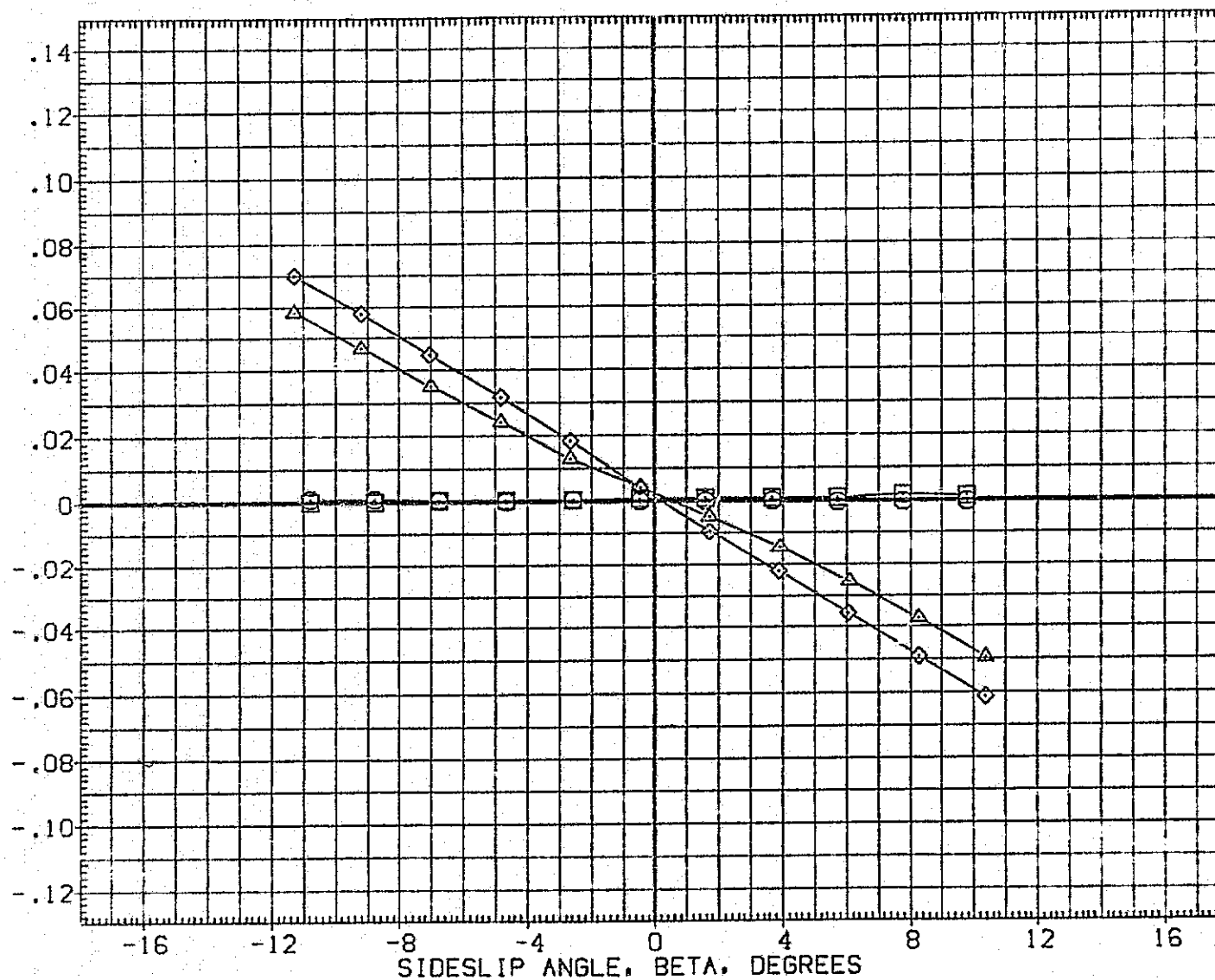


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (I)MACH = 2.99

DATA SET SYMBOL CONFIGURATION DESCRIPTION ET STING

(AIC002)	○	MSFC 594(1A33) 740TS (TIP1)	ET STING
(AIC003)	□	MSFC 594(1A33) 740TS (TIPIS(P2)	ET STING
(AIC006)	◇	MSFC 594(1A33) 740TS (TIP101)	ORB STING
(AIC008)	△	MSFC 594(1A33) 740TS (TIPIS(P201)	ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

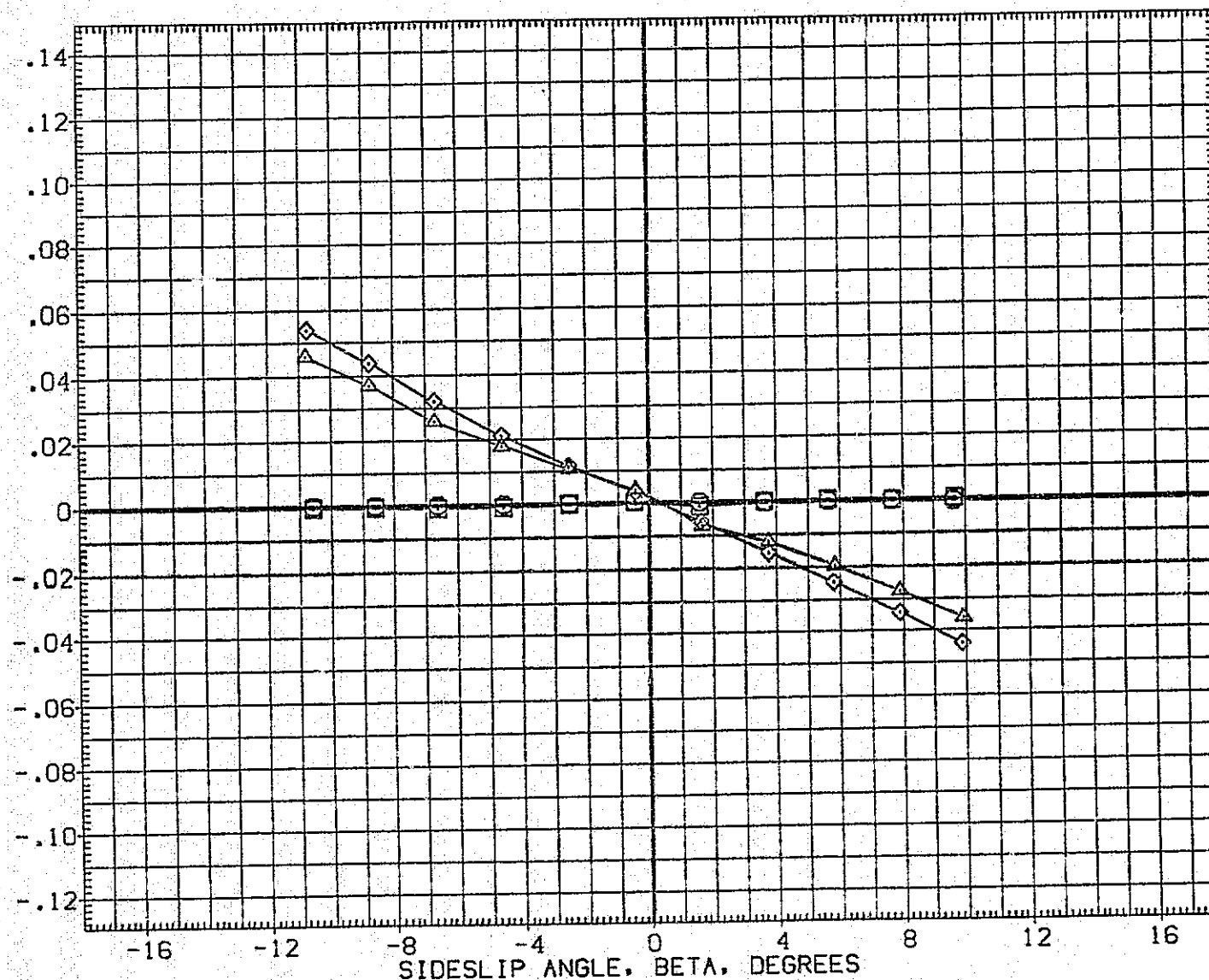


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
(J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(AIC002)	MSFC 594(1A33) 740TS (TIP1)	ET STING
(AIC003)	MSFC 594(1A33) 740TS (TIPISIP2)	ET STING
(AIC006)	MSFC 594(1A33) 740TS (TIP101)	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

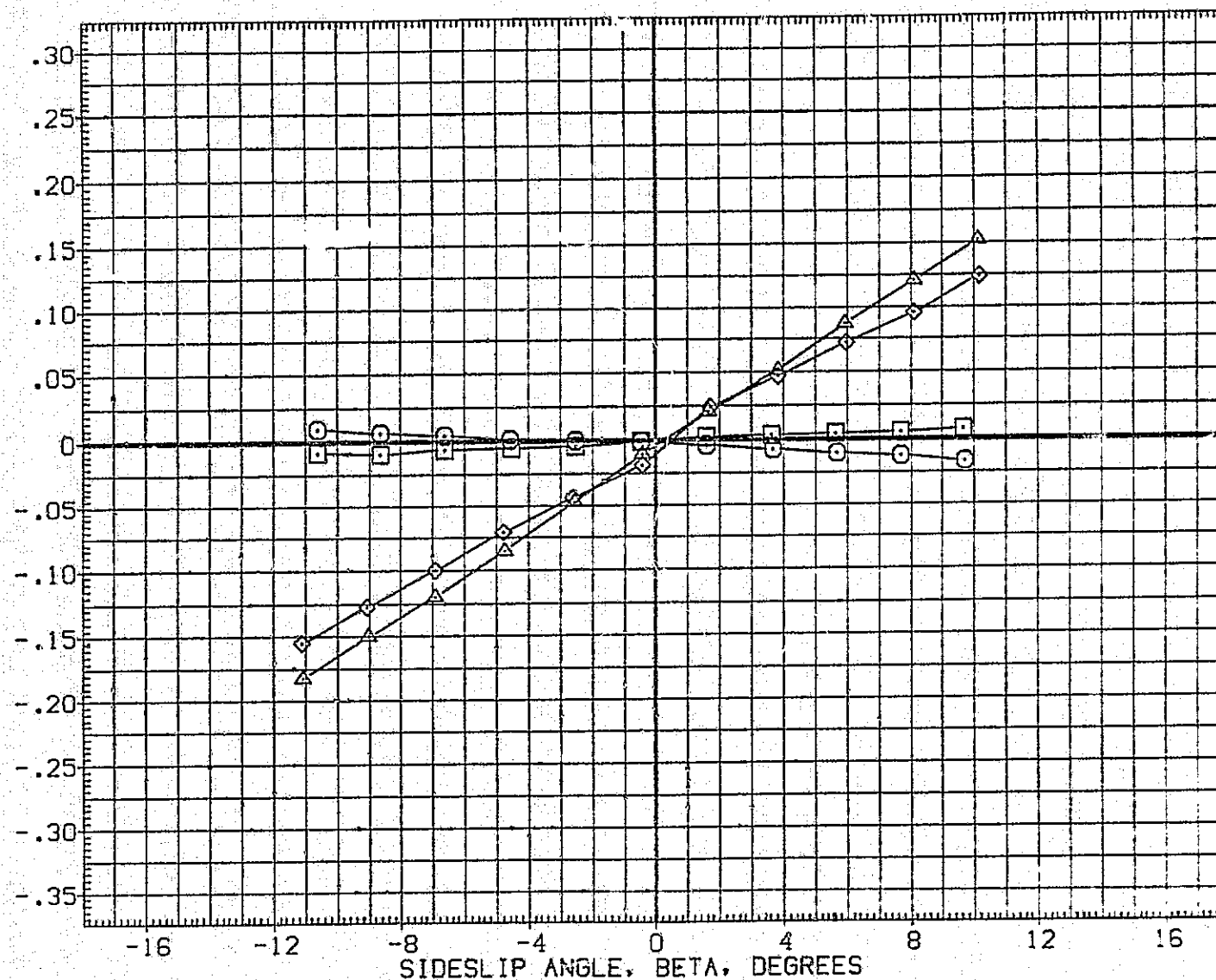


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC002)	DATA NOT AVAILABLE
(AIC003)	DATA NOT AVAILABLE
(AIC006)	DATA NOT AVAILABLE
(AIC008)	MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

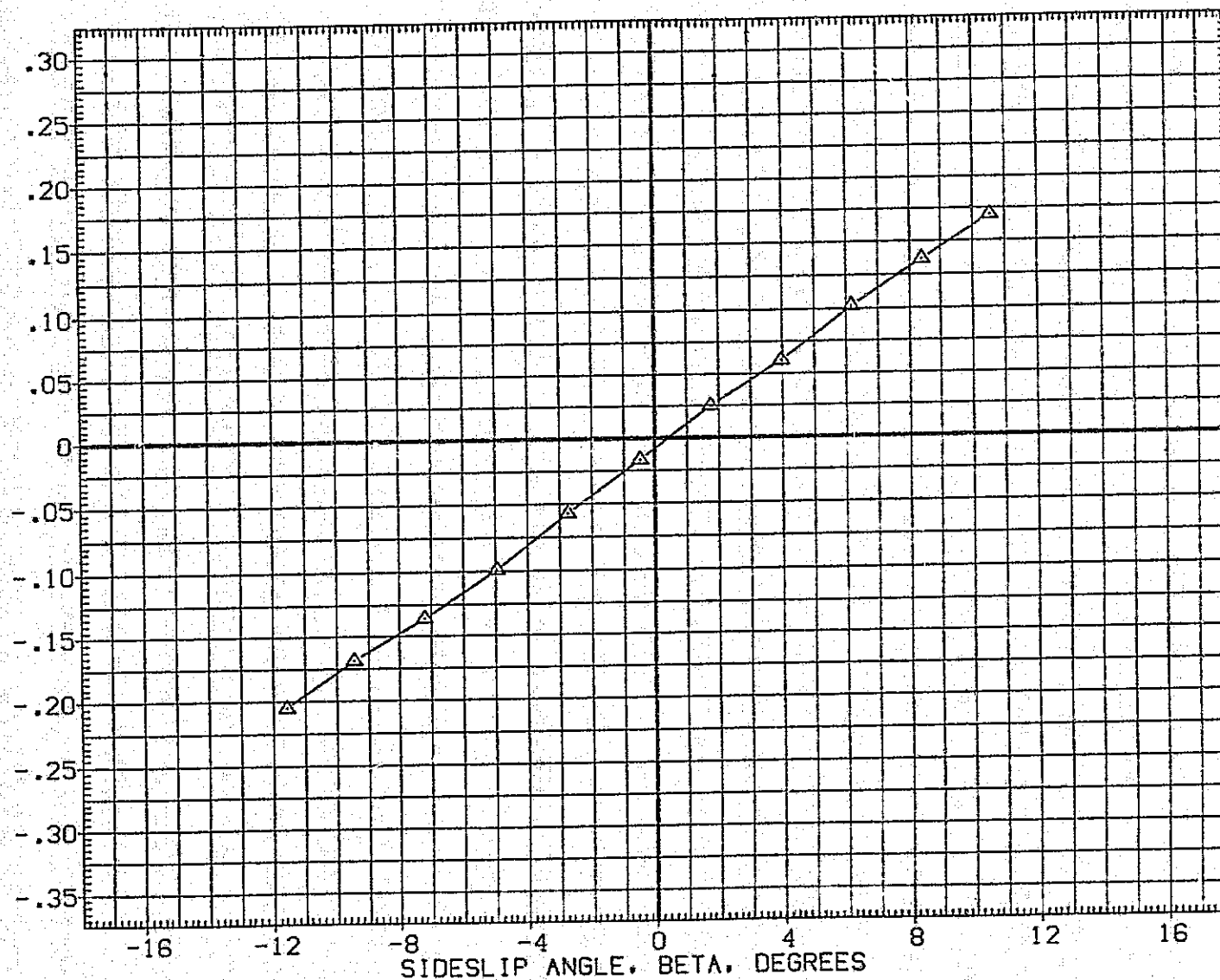


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(AIC002)	MSFC 594(A33) 740TS (TIP1)	ET STING
(AIC003)	MSFC 594(A33) 740TS (TIP1P2)	ET STING
(AIC006)	MSFC 594(A33) 740TS (TIP101)	ORB STING
(AIC008)	MSFC 594(A33) 740TS (TIP1SIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

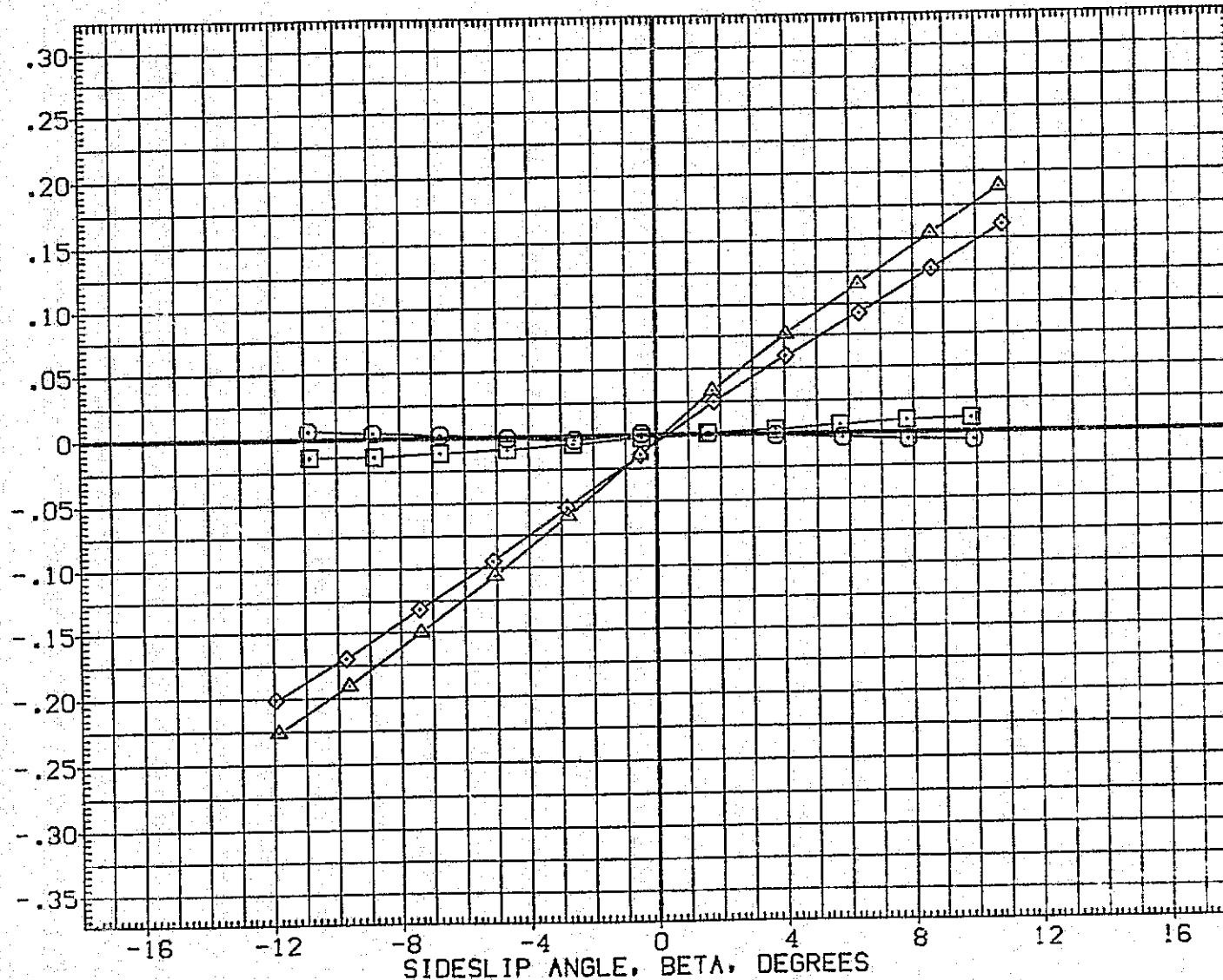


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (C)MACH = .90

DATA SET SYMBOL CONFIGURATION DESCRIPTION

[AIC002] □ DATA NOT AVAILABLE
 [AIC003] □ DATA NOT AVAILABLE
 [AIC006] ◇ DATA NOT AVAILABLE
 [AIC008] △ MSFC 594 (A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

YAWING MOMENT COEFFICIENT, CYN

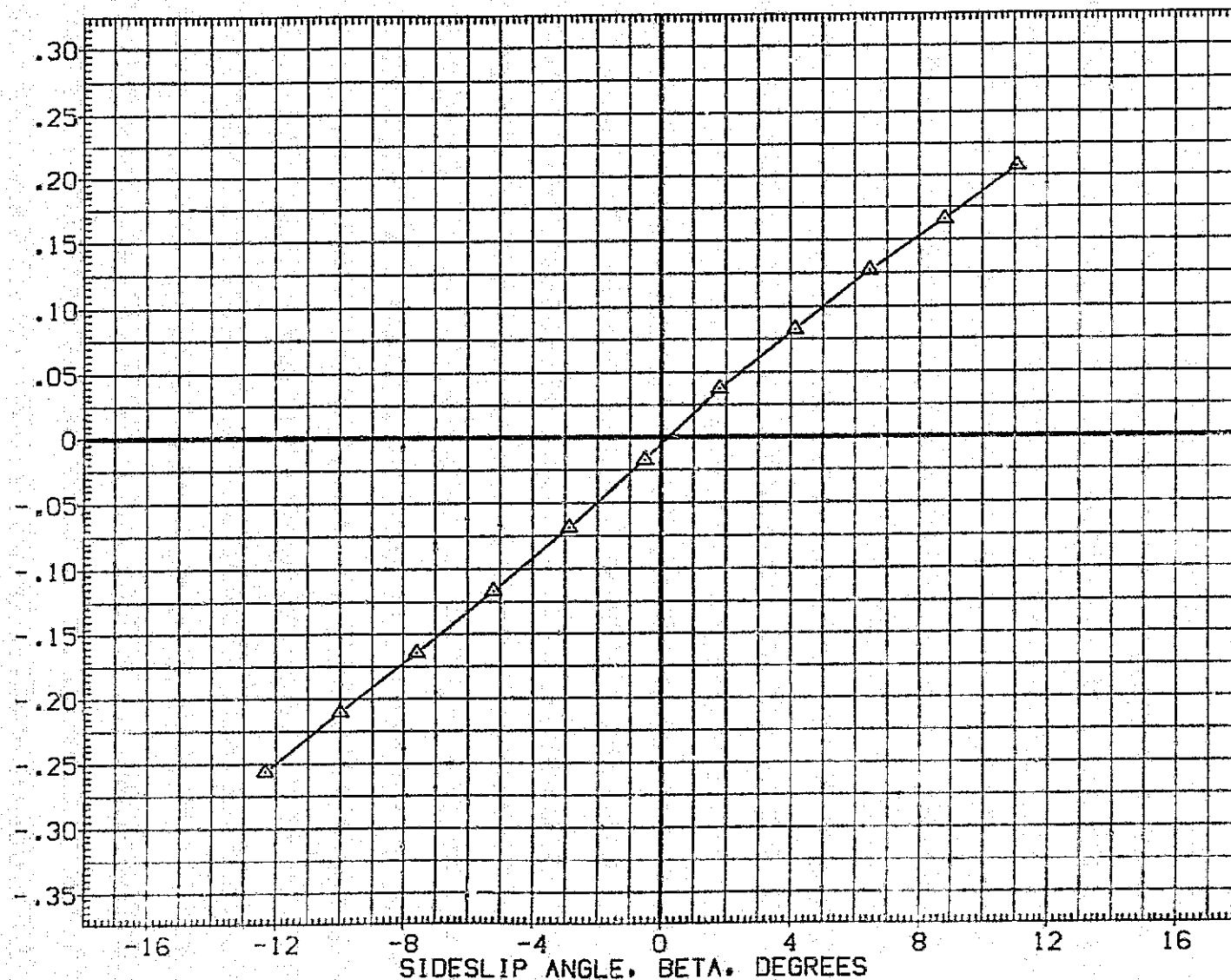


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(A1C002)	MSFC 594 (A33) 740TS (T1P1)	ET STING
(A1C003)	MSFC 594 (A33) 740TS (T1P1SIP2)	ET STING
(A1C006)	MSFC 594 (A33) 740TS (T1P1D1)	ORB STING
(A1C008)	MSFC 594 (A33) 740TS (T1P1SIP2D1)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

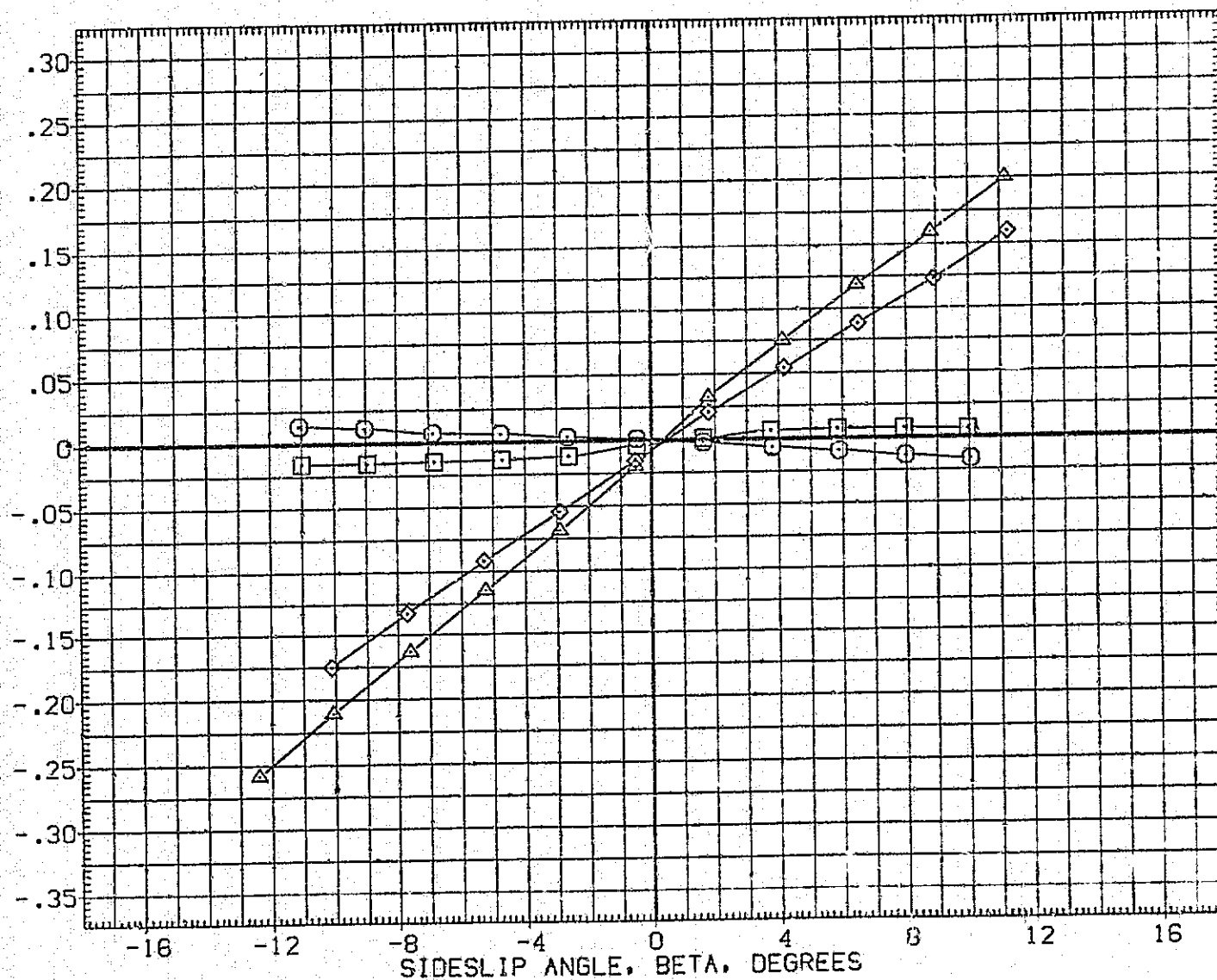


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC002)	MSFC 594(I A33) 740TS (TIP1)
(AIC003)	MSFC 594(I A33) 740TS (TIP1SIP2)
(AIC006)	MSFC 594(I A33) 740TS (TIP101)
(AIC008)	MSFC 594(I A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

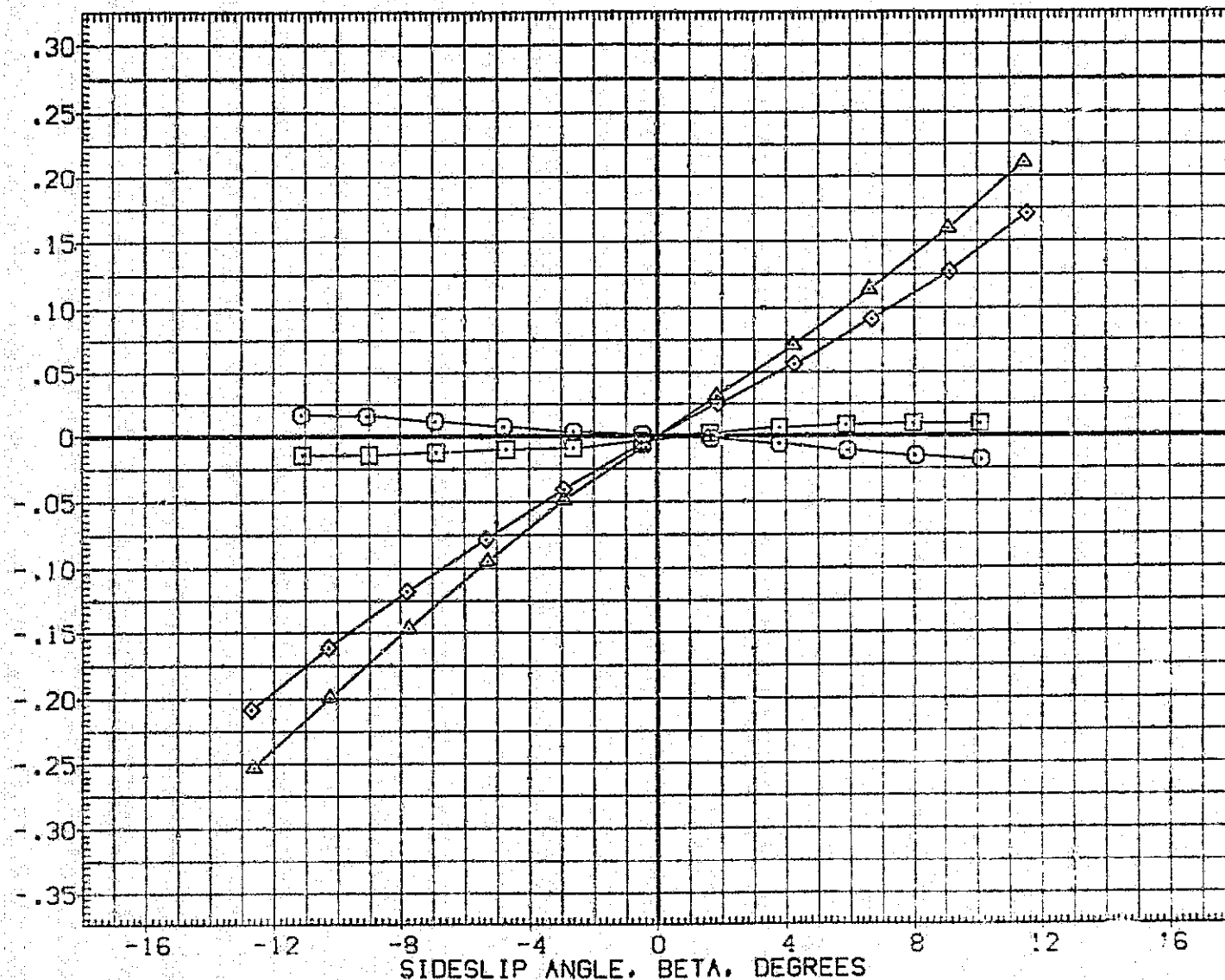


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (F)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
[A1C002]	DATA NOT AVAILABLE
[A1C003]	DATA NOT AVAILABLE
[A1C006]	DATA NOT AVAILABLE
[A1C008]	MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

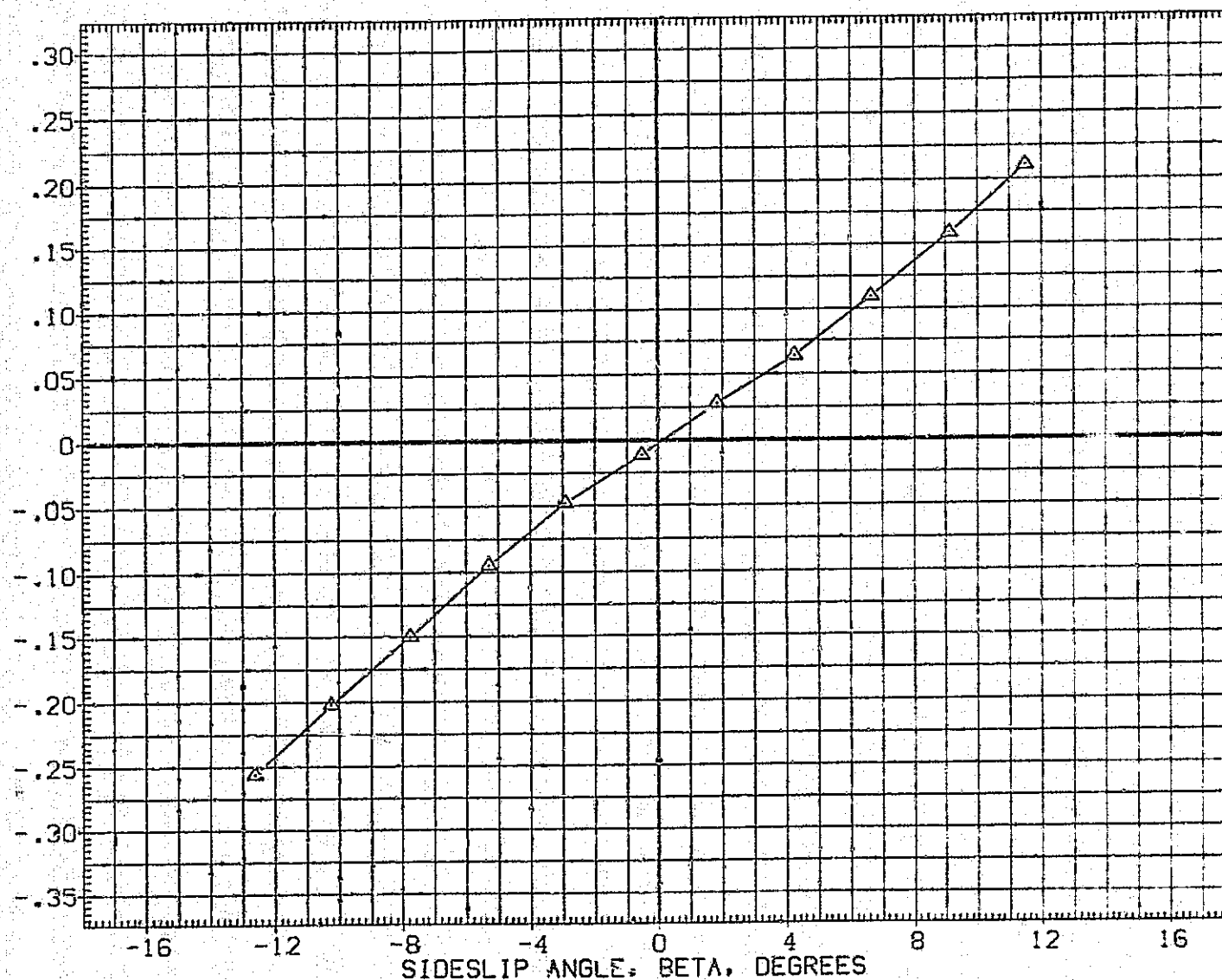


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (G)MACH = 1.47

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C002)	MSFC 594(A33) 740TS (TIP1)
(A1C003)	MSFC 594(A33) 740TS (TIPISIP2)
(A1C006)	MSFC 594(A33) 740TS (TIP101)
(A1C009)	MSFC 594(A33) 740TS (TIPISIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XM RP	976.0000	IN. XT
YM RP	.0000	IN. YT
ZM RP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

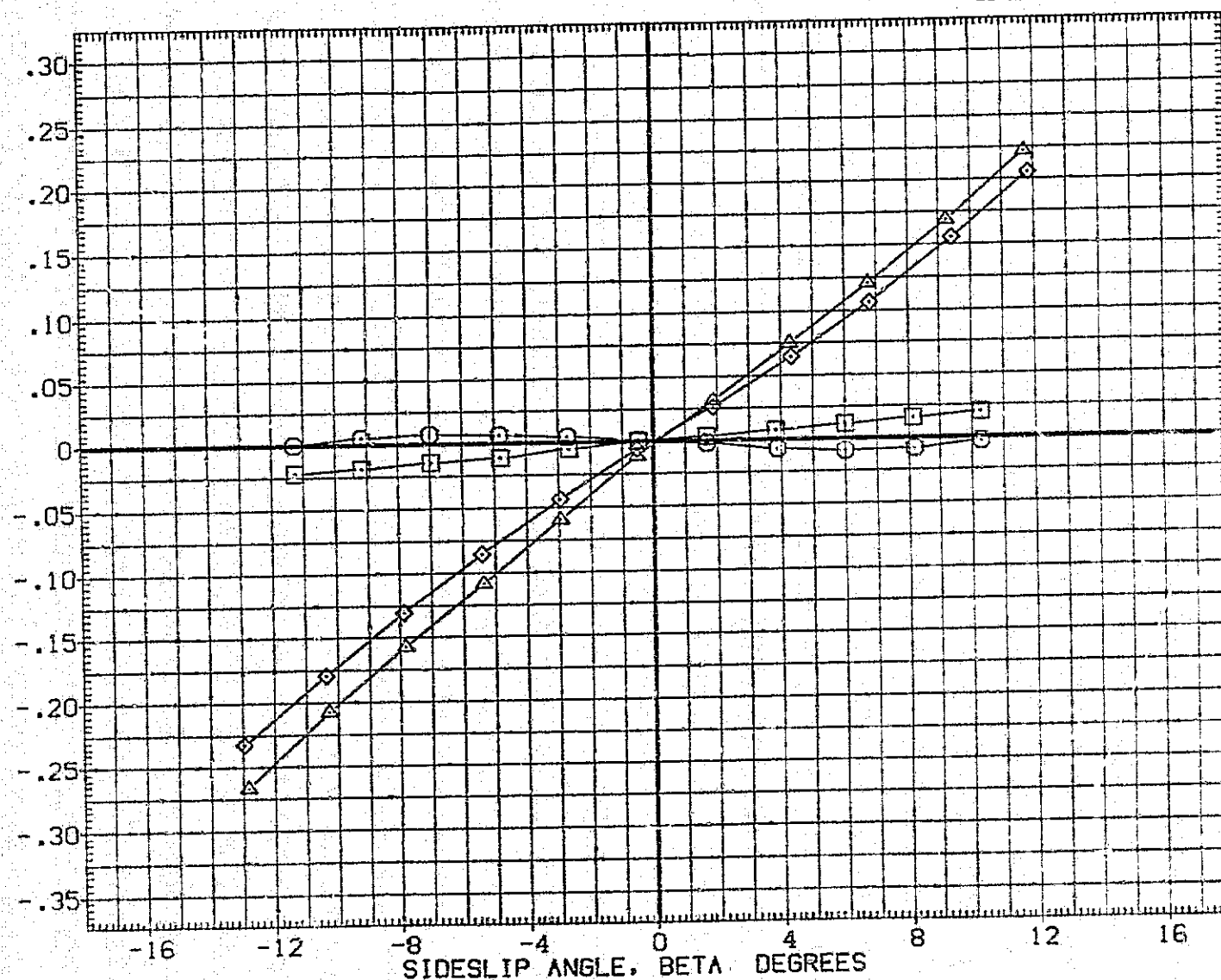


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (H)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC002)	MSFC 594(A33) 740TS (TIP1)
(AIC003)	MSFC 594(A33) 740TS (TIPISIP2)
(AIC006)	MSFC 594(A33) 740TS (TIP101)
(AIC008)	MSFC 594(A33) 740TS (TIPISIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0700	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

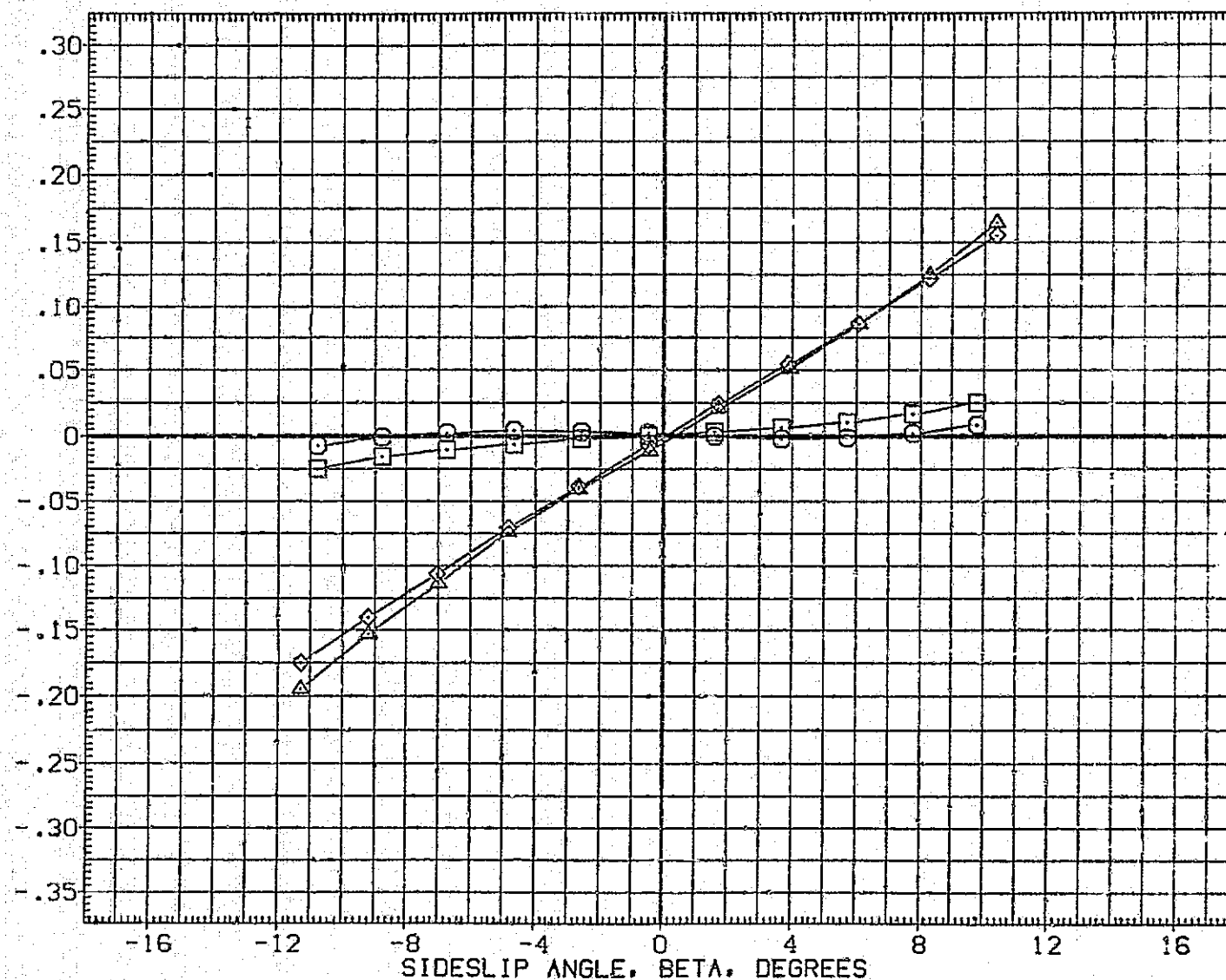


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (I)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(AIC002)	MSFC 594(A33) 740TS (TIP1)	ET STING
(AIC003)	MSFC 594(A33) 740TS (TIP1SIP2)	ET STING
(AIC006)	MSFC 594(A33) 740TS (TIP101)	ORB STING
(AIC008)	MSFC 594(A33) 740TS (TIP1SIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

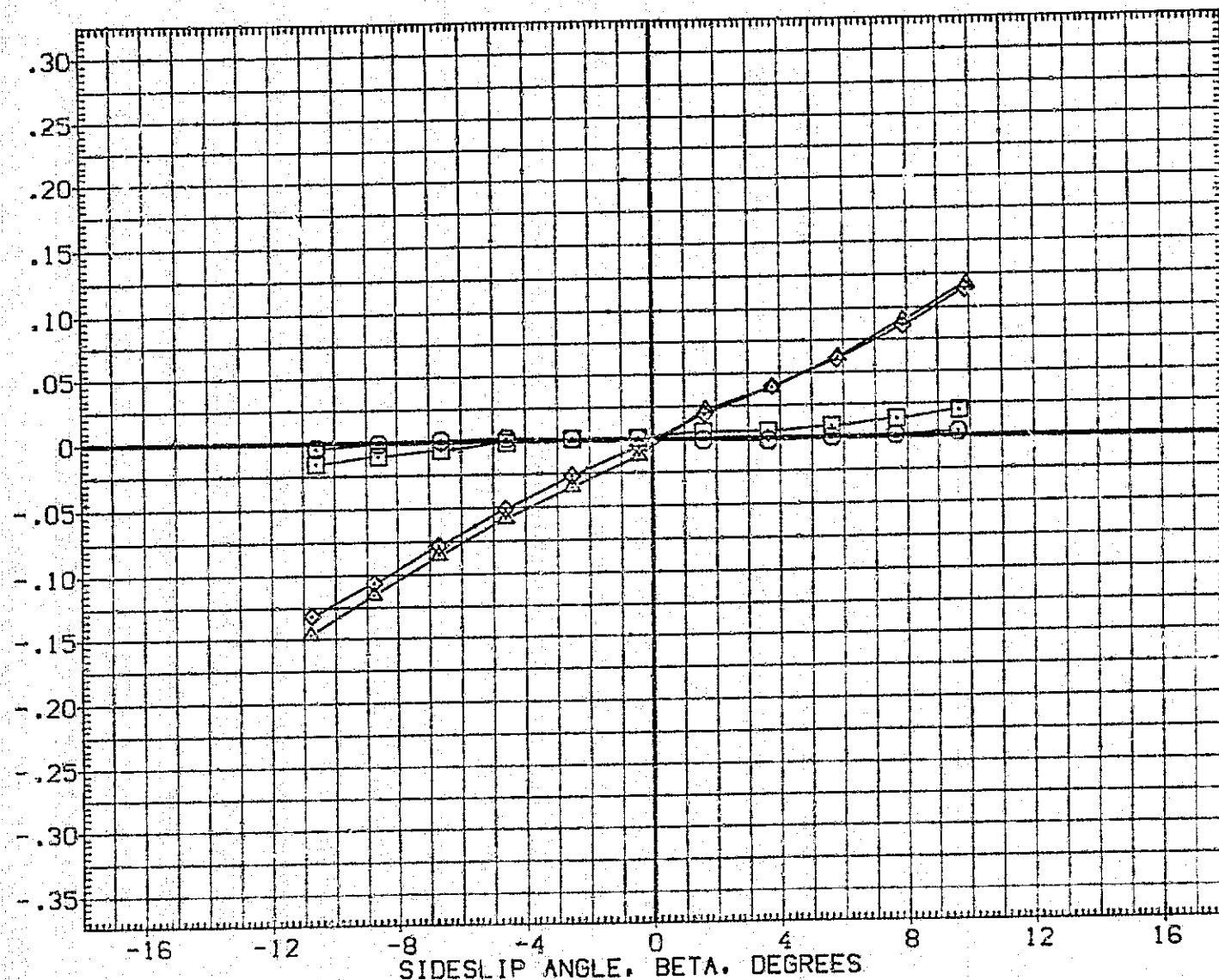


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
(J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(A1C002)	MSFC 594(1A33) 740TS (TIP1)	ET STING
(A1C003)	MSFC 594(1A33) 740TS (TIP1S1P2)	ET STING
(A1C006)	MSFC 594(1A33) 740TS (TIP1Q1)	ORB STING
(A1C008)	MSFC 594(1A33) 740TS (TIP1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

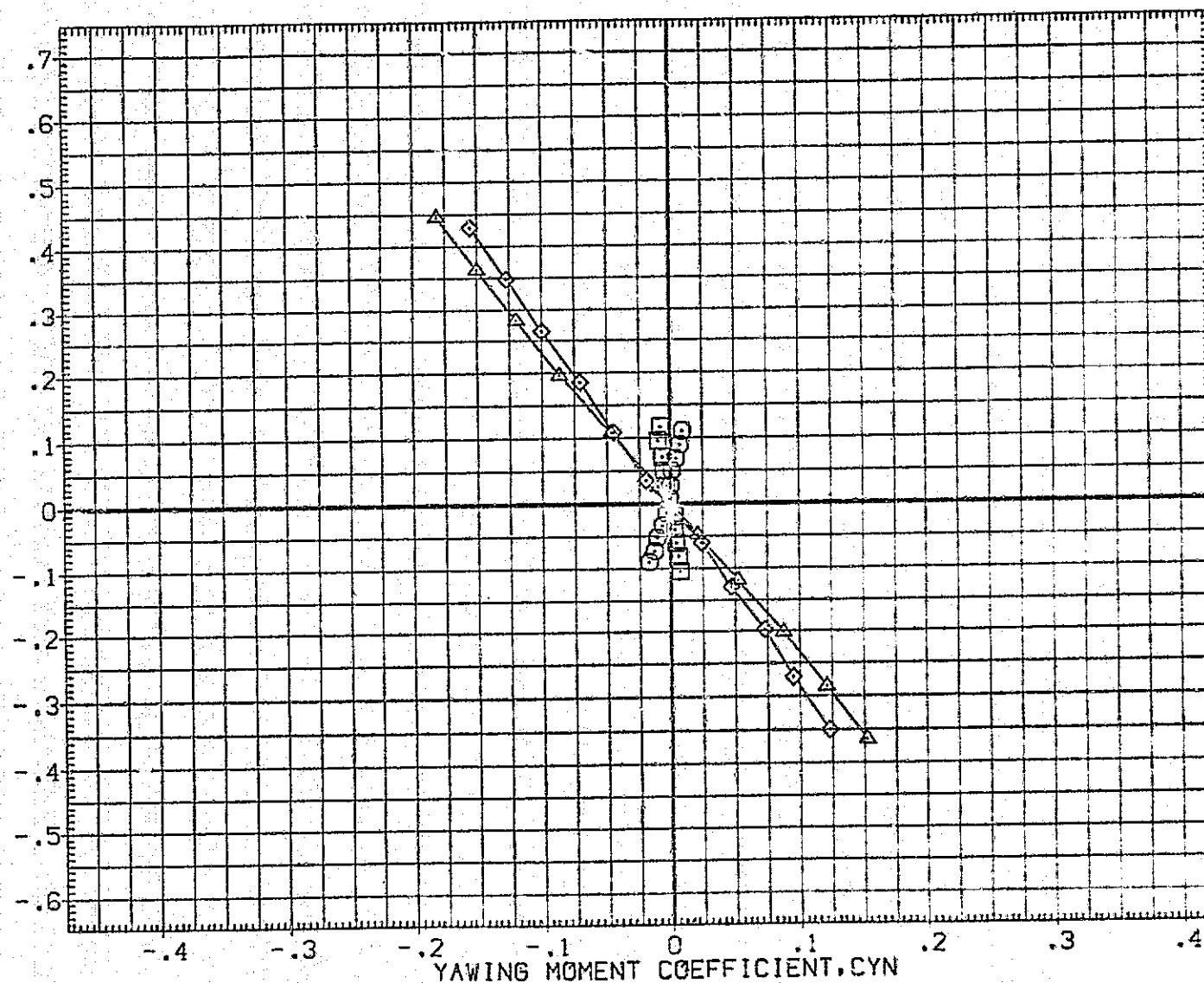


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (A)MACH = .60

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(A1C002) □ DATA NOT AVAILABLE
 (A1C003) □ DATA NOT AVAILABLE
 (A1C006) □ DATA NOT AVAILABLE
 (A1C008) △ MSFC 5941(A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SIDE-FORCE COEFFICIENT, CY

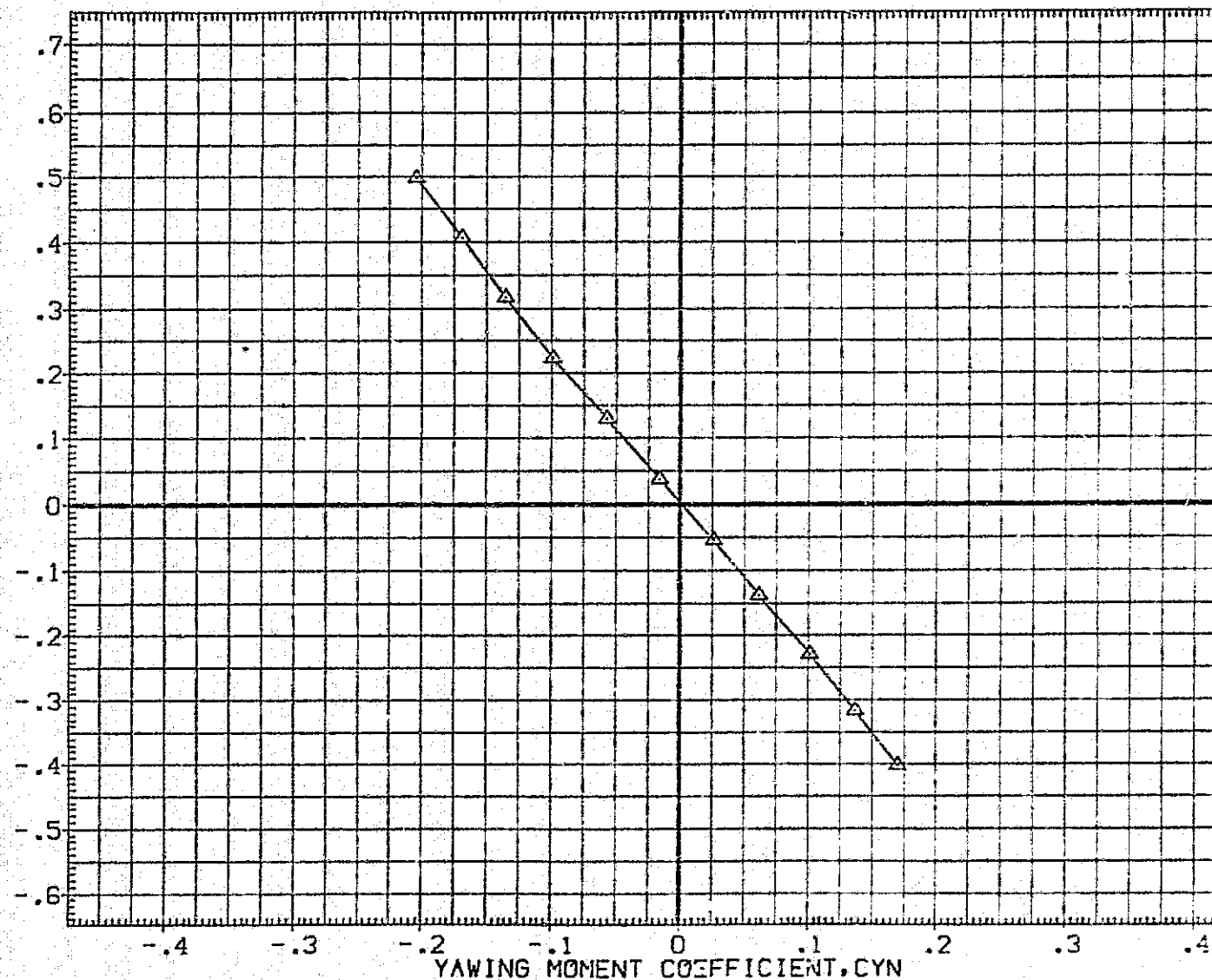


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG

(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C002)	MSFC 594(1A33) 740TS (TIP1)
(A1C003)	MSFC 594(1A33) 740TS (TIP1SIP2)
(A1C006)	MSFC 594(1A33) 740TS (TIP101)
(A1C008)	MSFC 594(1A33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

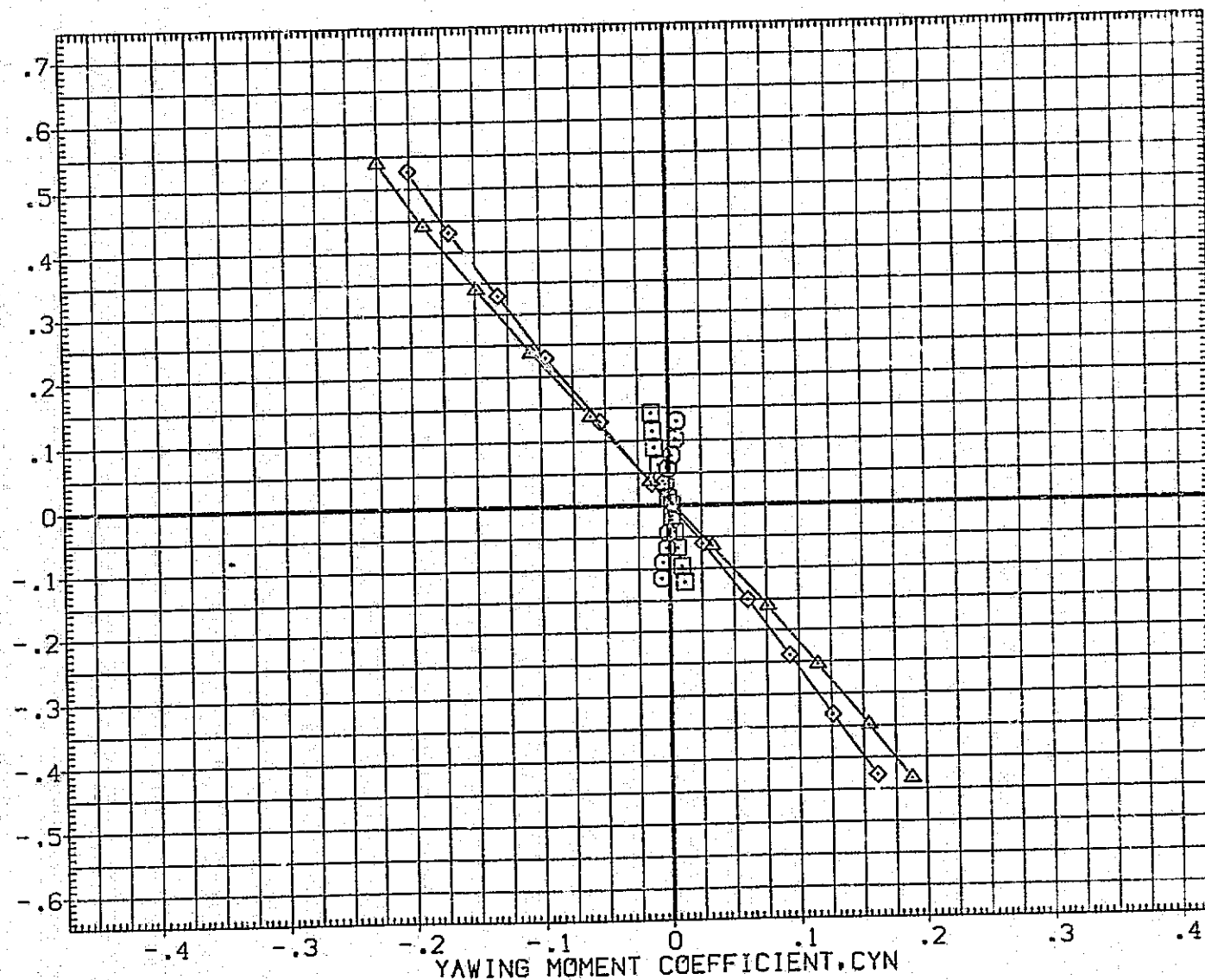


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
{AIC002}	DATA NOT AVAILABLE
{AIC003}	DATA NOT AVAILABLE
{AIC005}	DATA NOT AVAILABLE
{AIC008}	MSFC 594(A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

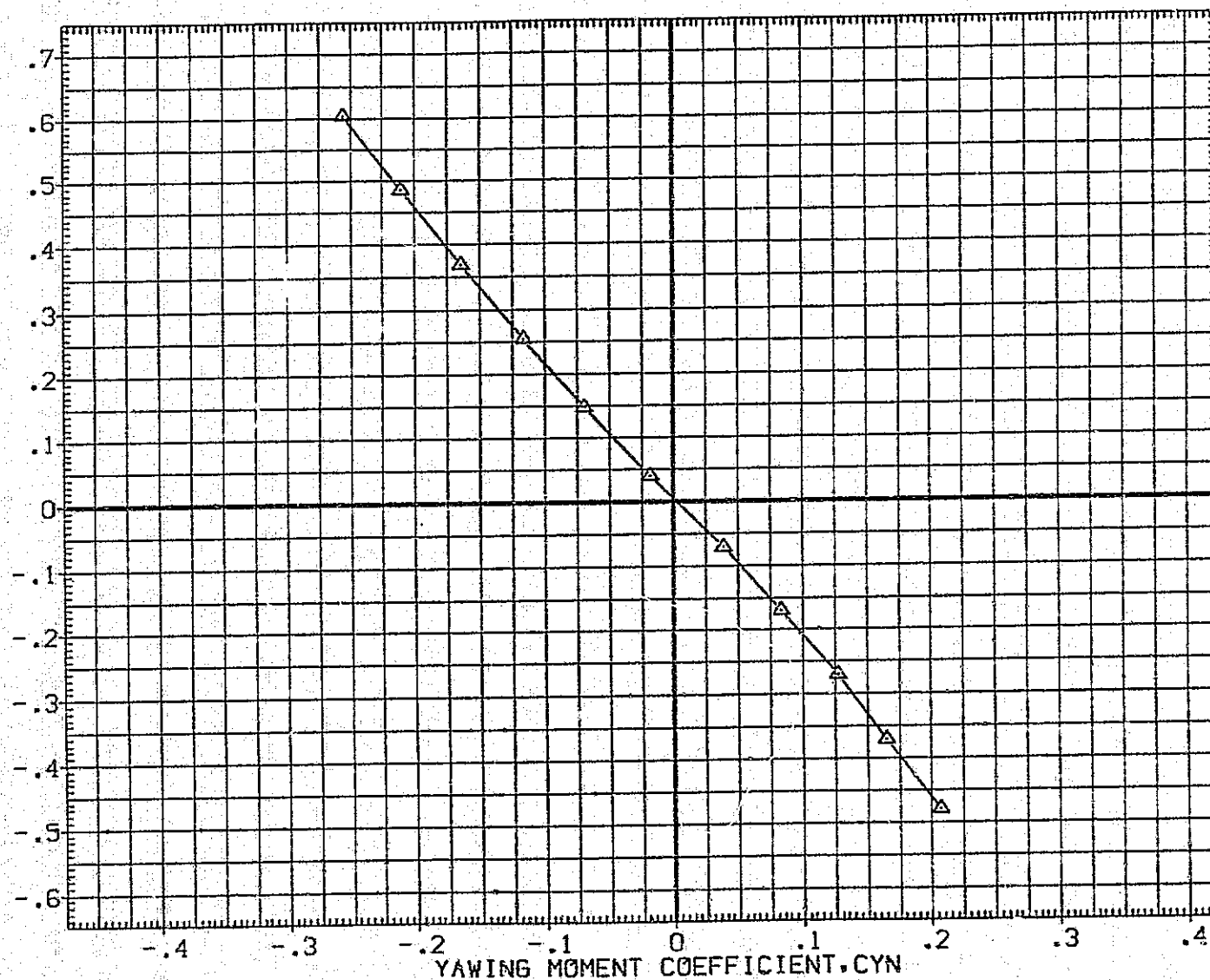


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C002)	MSFC 594(IA33) 740TS (TIP1)
(A1C003)	MSFC 594(IA33) 740TS (TIP1P2)
(A1C006)	MSFC 594(IA33) 740TS (TIP101)
(A1C008)	MSFC 594(IA33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

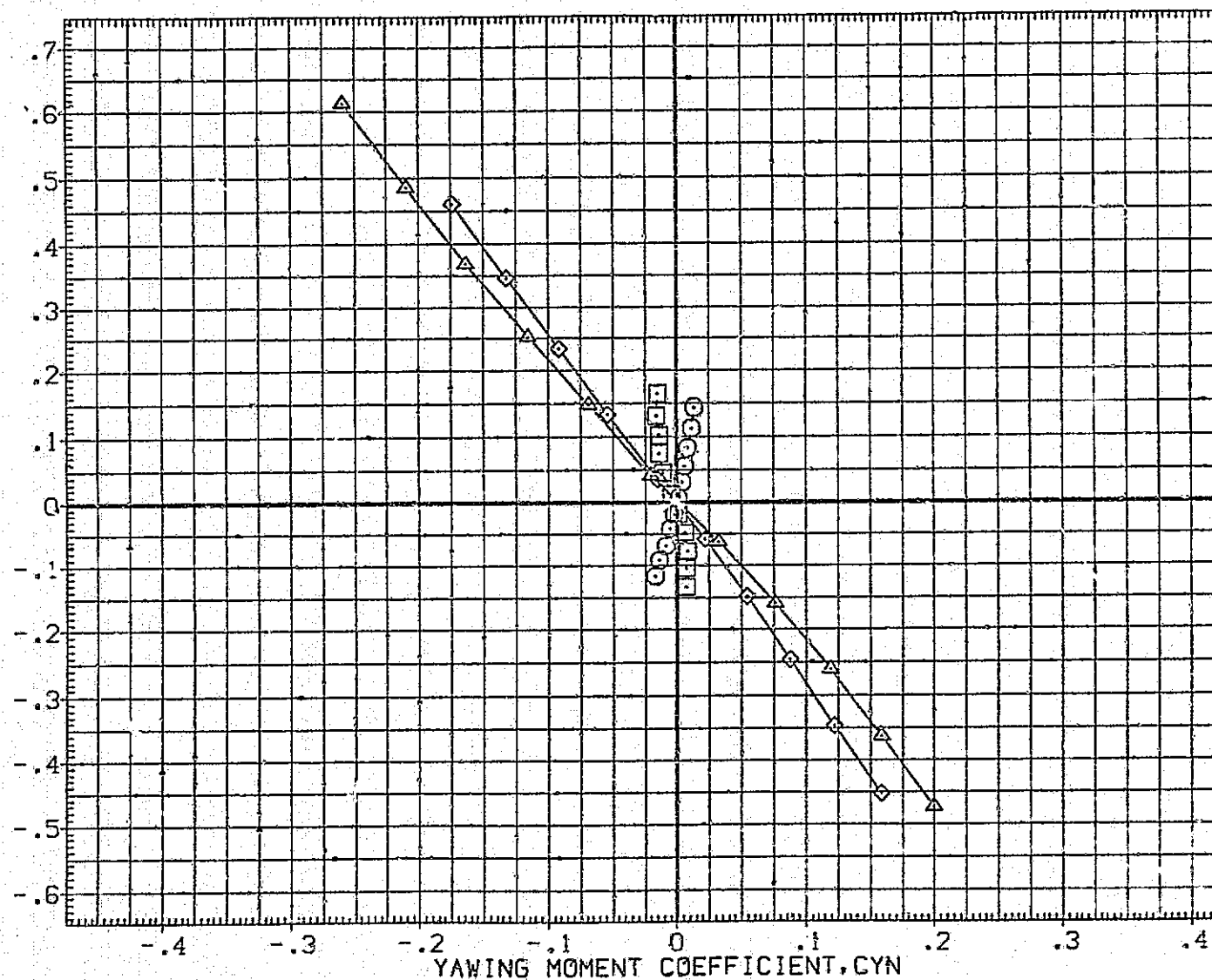


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC002)	MSFC 594(IA33) 740TS (TIP1)
(AIC003)	MSFC 594(IA33) 740TS (TIP1SIP2)
(AIC006)	MSFC 594(IA33) 740TS (TIP101)
(AIC008)	MSFC 594(IA33) 740TS (TIP1SIP201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

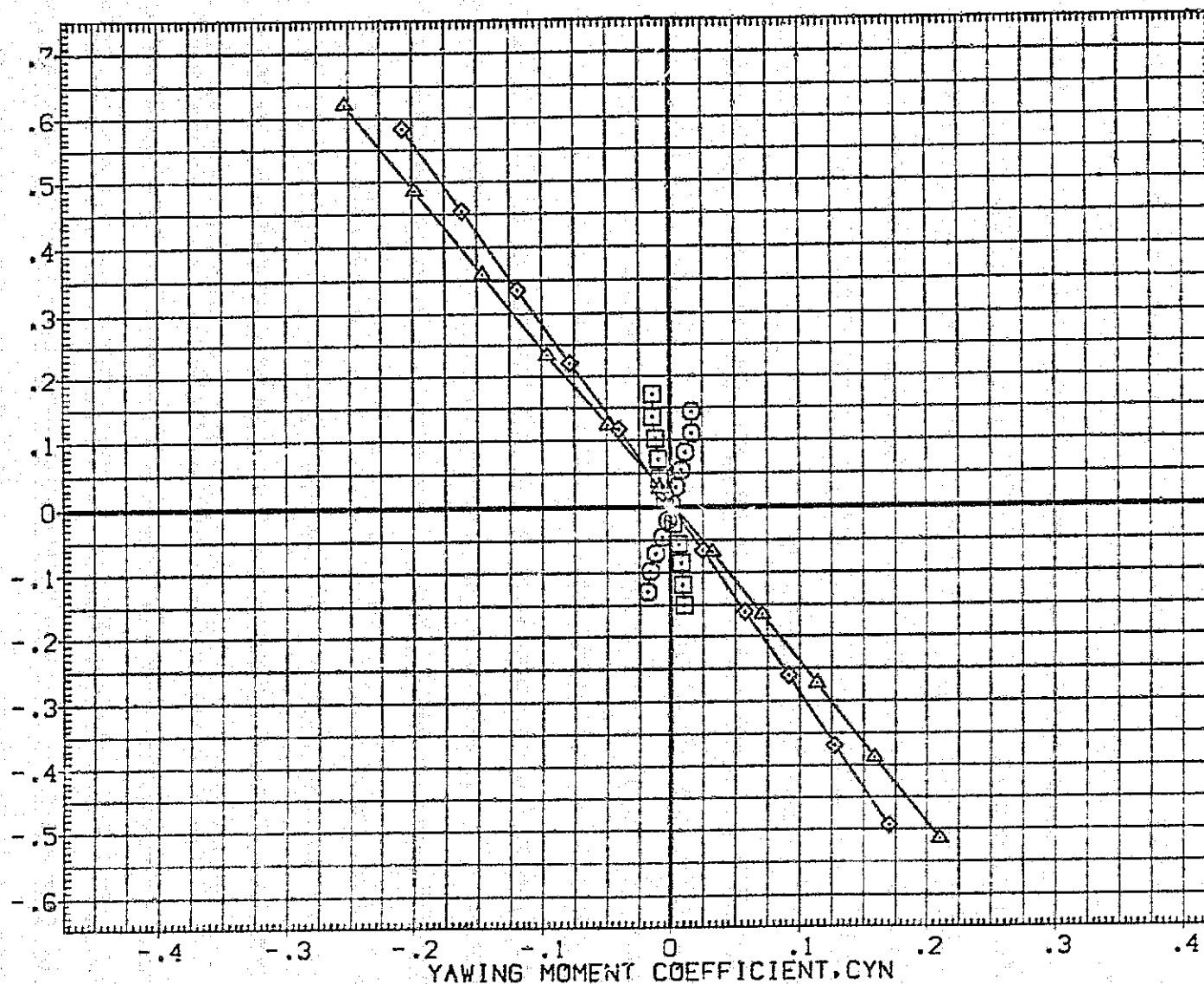


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (AIC002) □ DATA NOT AVAILABLE
 (AIC003) □ DATA NOT AVAILABLE
 (AIC006) □ DATA NOT AVAILABLE
 (AIC008) △ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SIDE-FORCE COEFFICIENT, CY

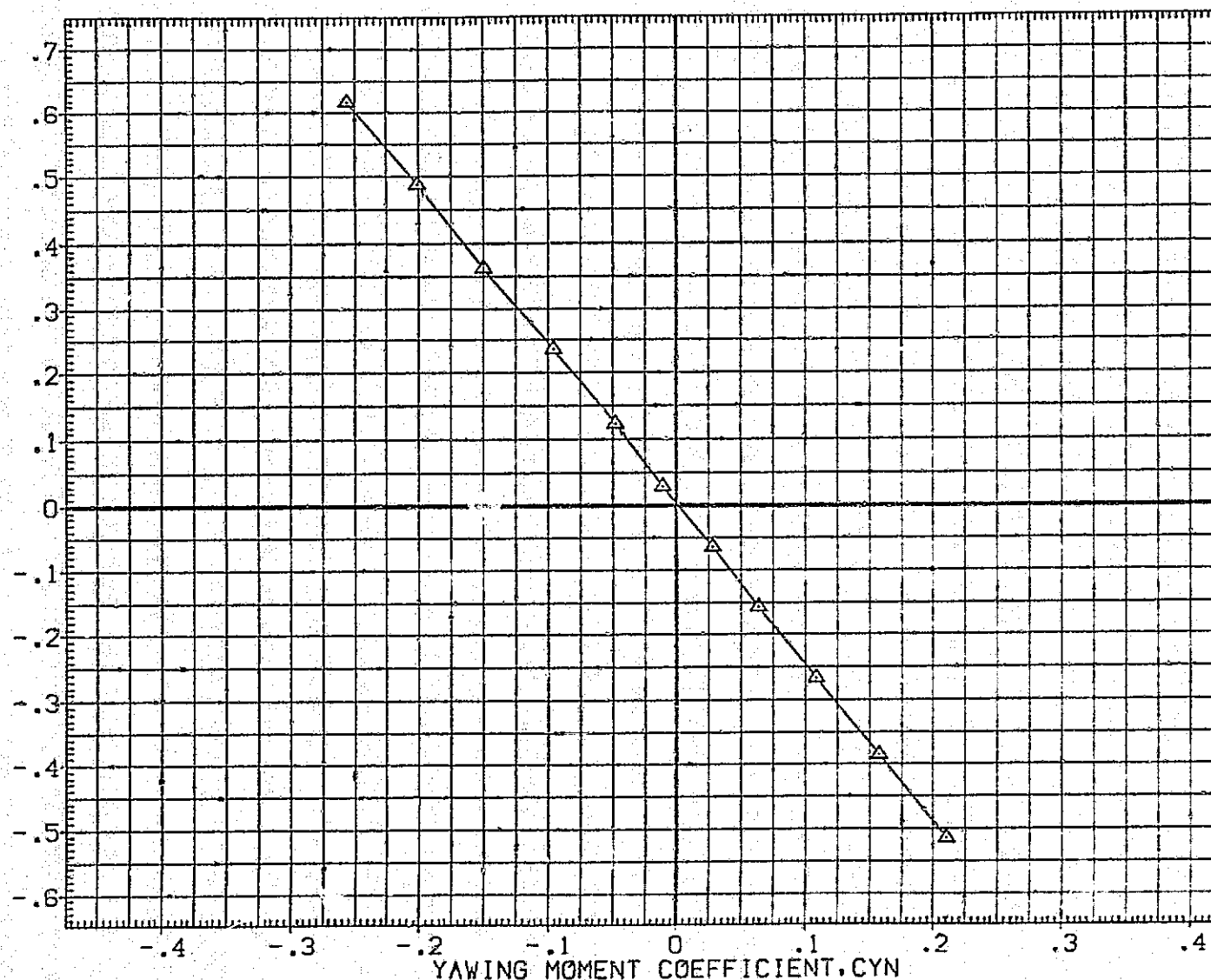


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (G)MACH = 1.47 PAGE 112

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(AIC002)	MSFC 594(IA33) 740TS (TIP1)	ET STING
(AIC003)	MSFC 594(IA33) 740TS (TIP1P2)	ET STING
(AIC006)	MSFC 594(IA33) 740TS (TIP101)	ORB STING
(AIC008)	MSFC 594(IA33) 740TS (TIP1SLP201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

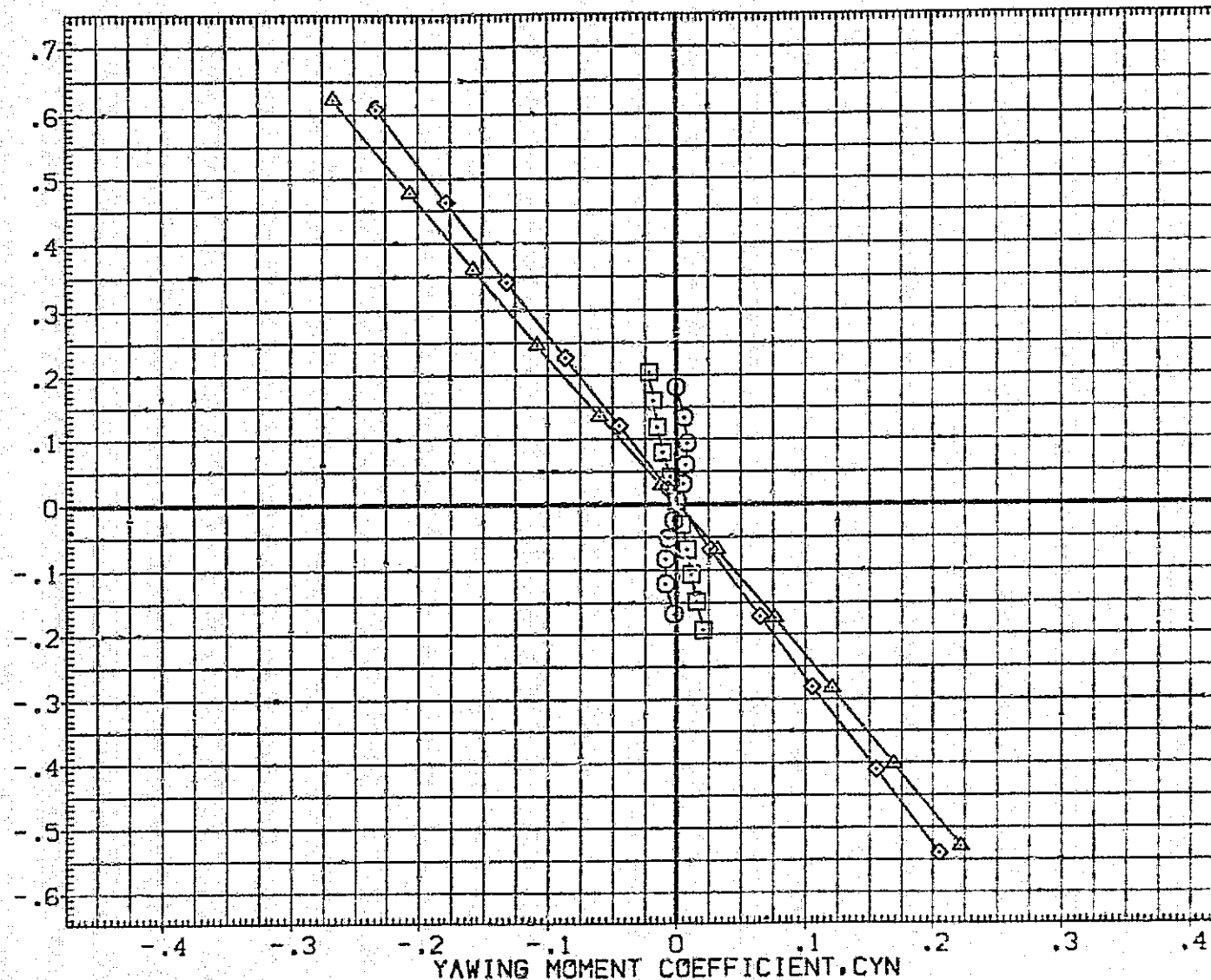


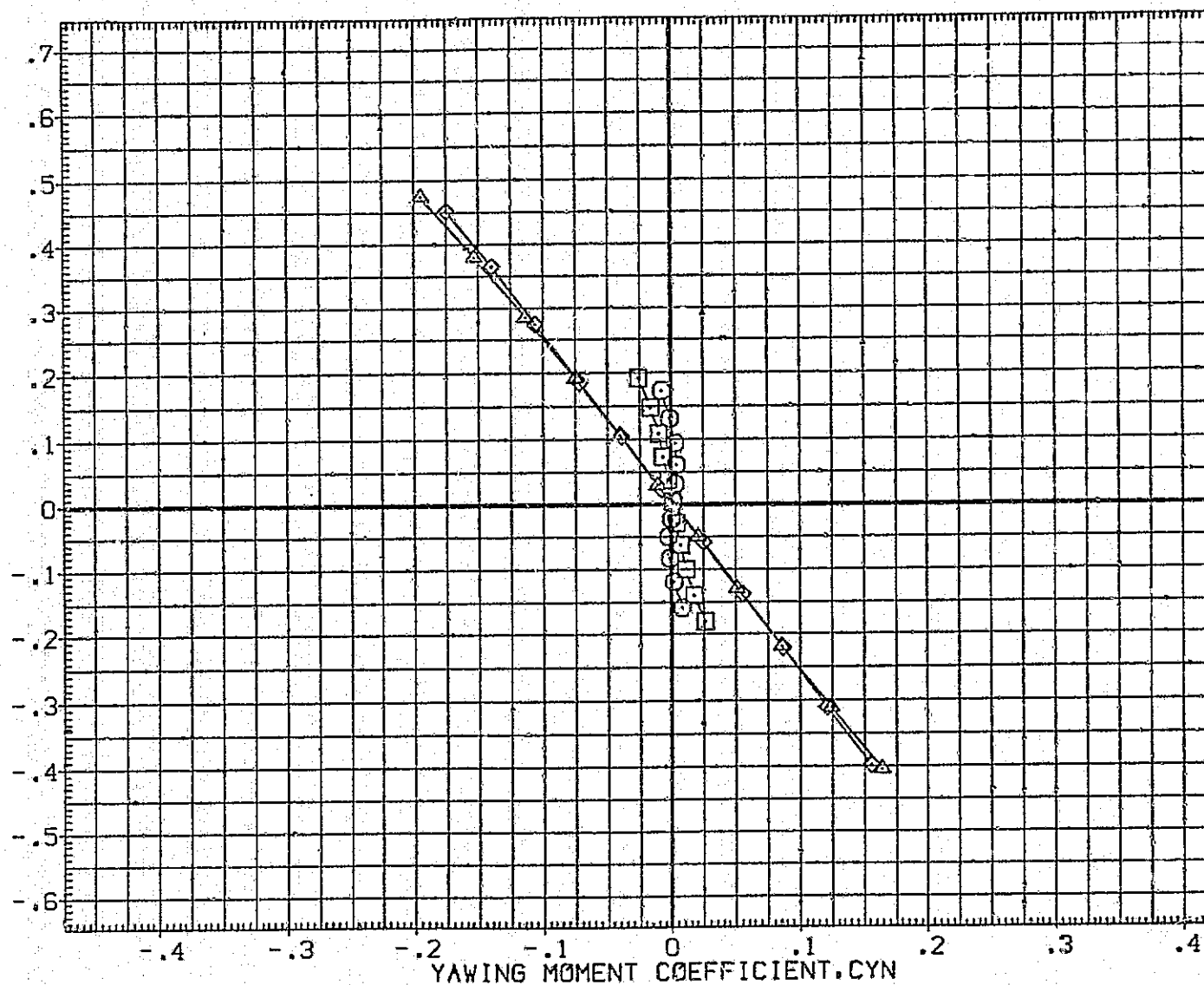
FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
(H)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC002)	MSFC 594(1A33) 740TS (TIP1)
(AIC003)	MSFC 594(1A33) 740TS (TIP1P2)
(AIC006)	MSFC 594(1A33) 740TS (TIP101)
(AIC008)	MSFC 594(1A33) 740TS (TIP1P201)

ET STING
ET STING
ORB STING
ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ET STING
(AIC002)	MSFC 594 (A33) 740TS (TIP1)	ET STING
(AIC003)	MSFC 594 (A33) 740TS (TIP1P2)	ET STING
(AIC006)	MSFC 594 (A33) 740TS (TIP101)	ORB STING
(AIC008)	MSFC 594 (A33) 740TS (TIP1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

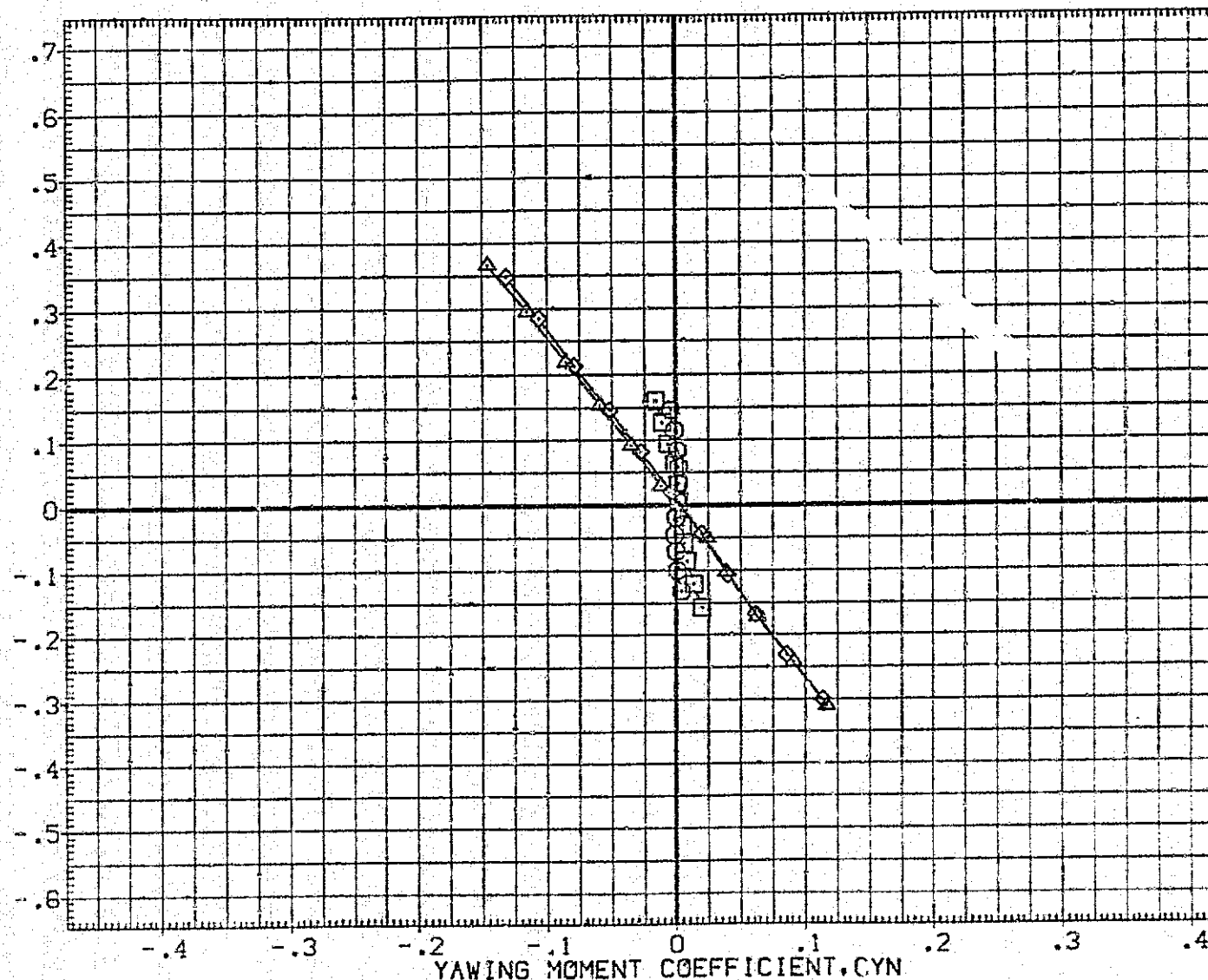


FIG 5 CONFIGURATION BUILDUP-EFFECT ON LATERAL/DIRECTIONAL CHAR., ALPHA = 0 DEG
 (J)MACH = 4.96

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

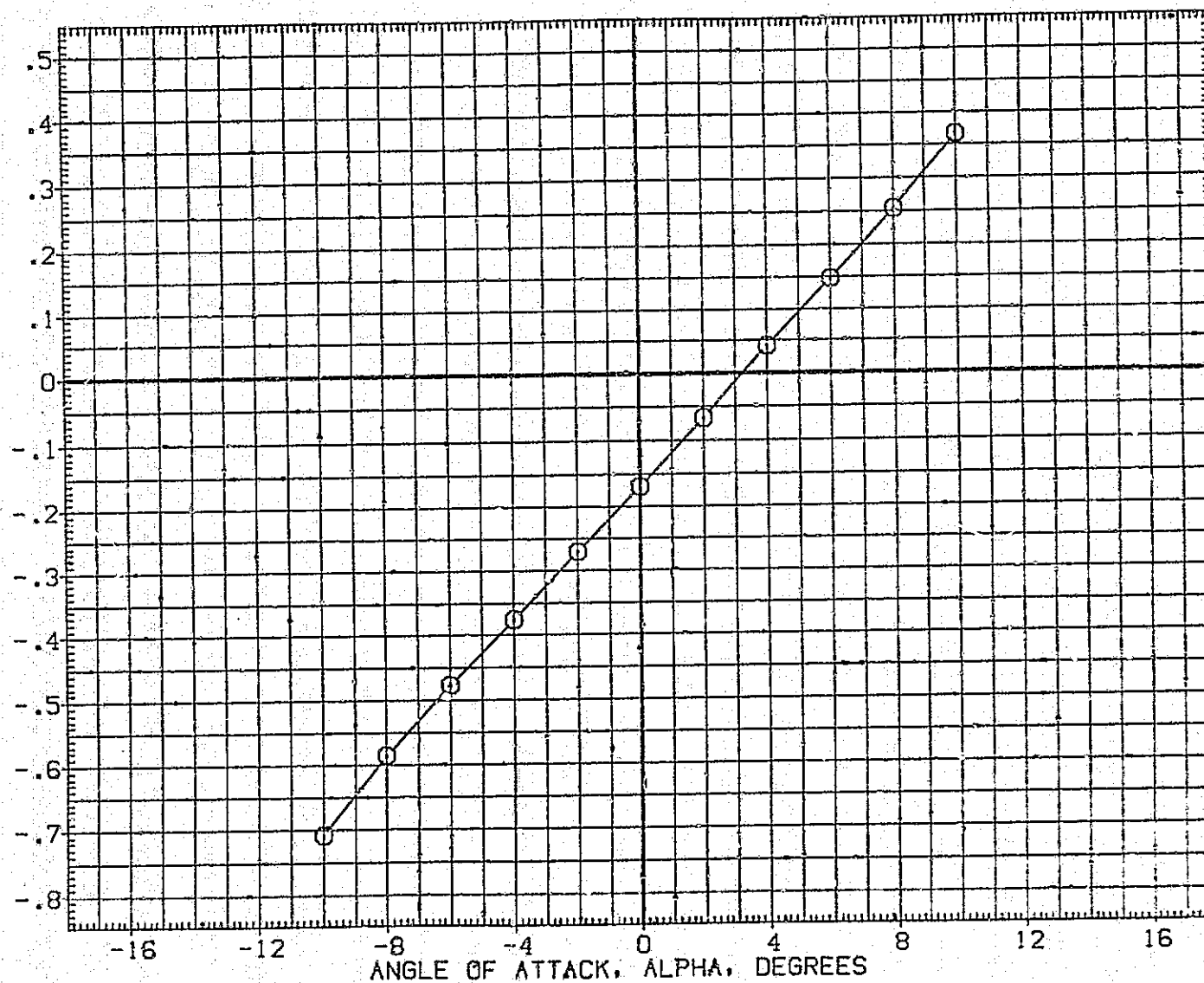


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (A)MACH = .60

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(1A33) 740TS (TIPIS1P201) DRB STING

REFERENCE INFORMATION
 SREF 2590.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

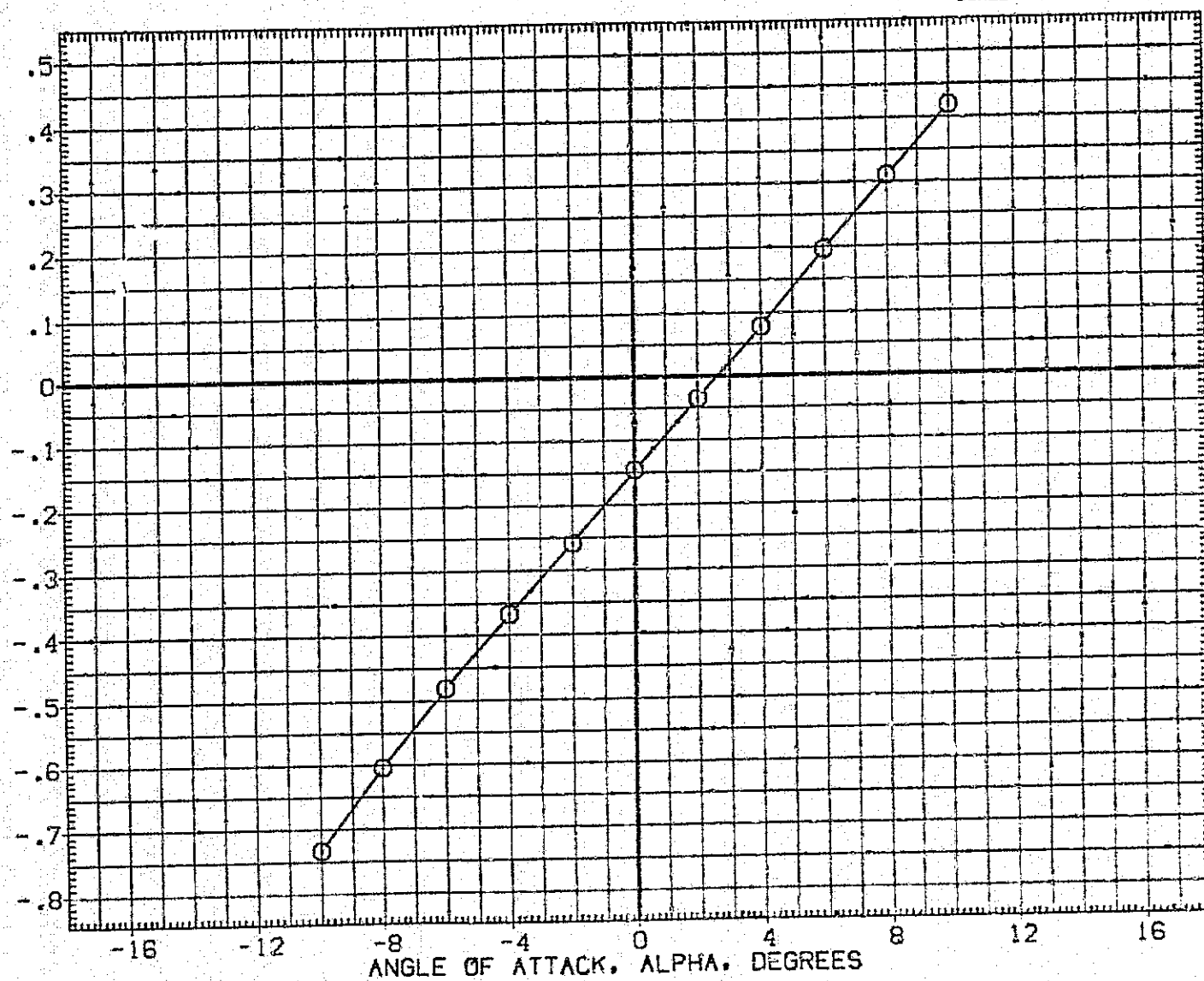


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (B)MACH = .80 PAGE 117

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(1A33) 740TS (TIP1S1P201) ORB STING

REFERENCE INFORMATION
 SREF 2890.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

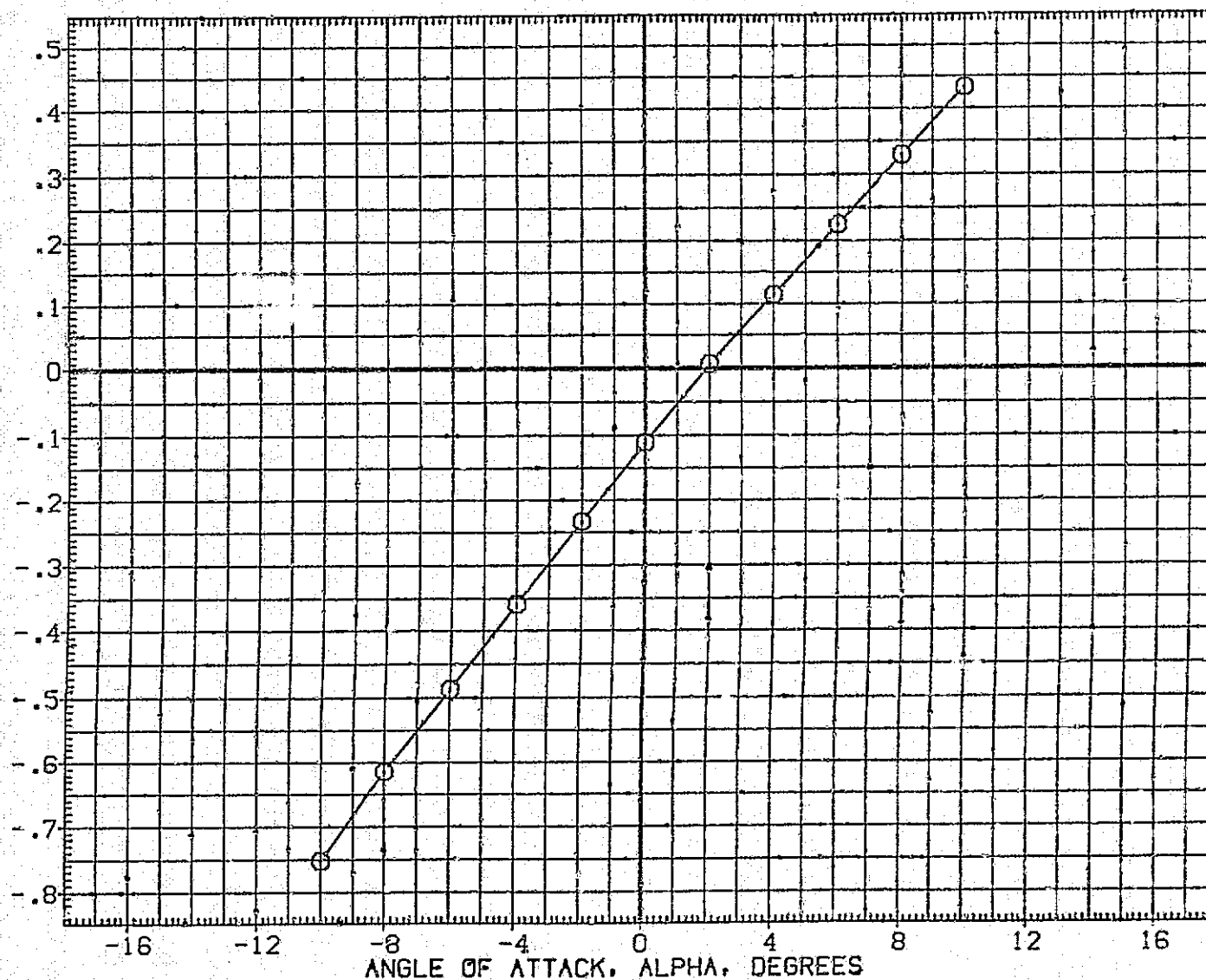


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(C)MACH = .90

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STRING
 (VIC007) O MSFC 594(1A33) 740TS (TIP1SIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

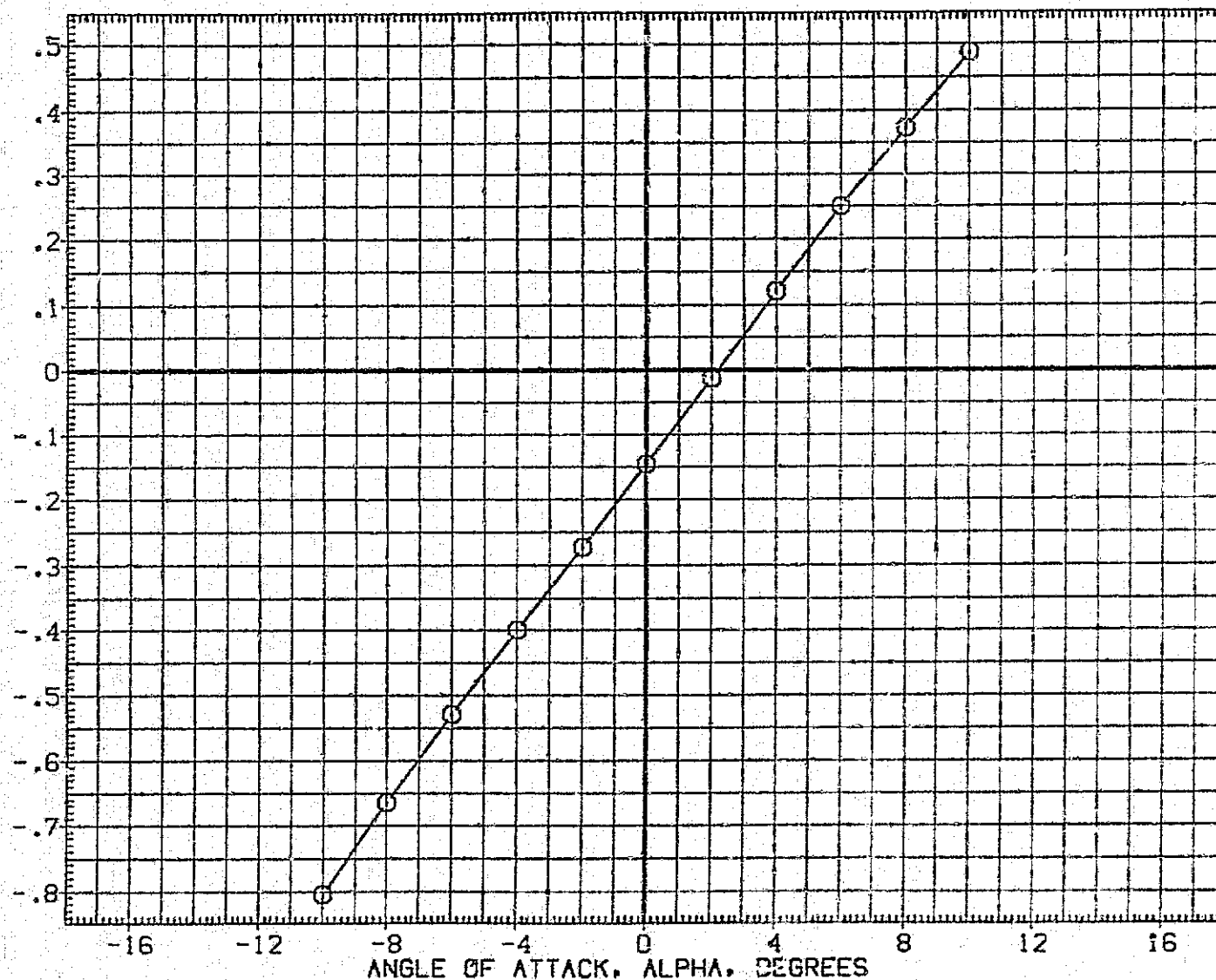


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(O)MACH = 1.10

NORMAL FORCE COEFFICIENT, CN

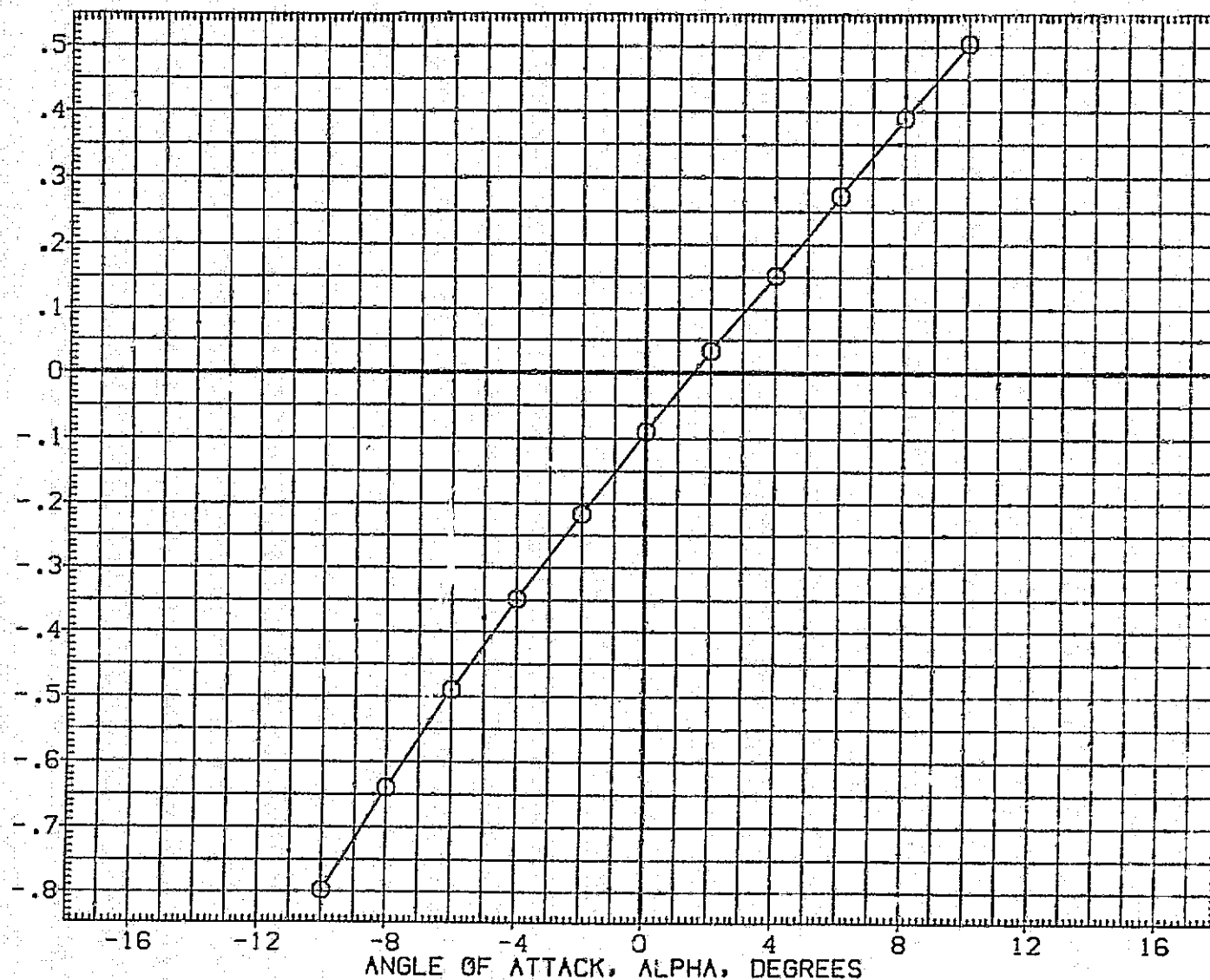


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(E)MACH = 1.25

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

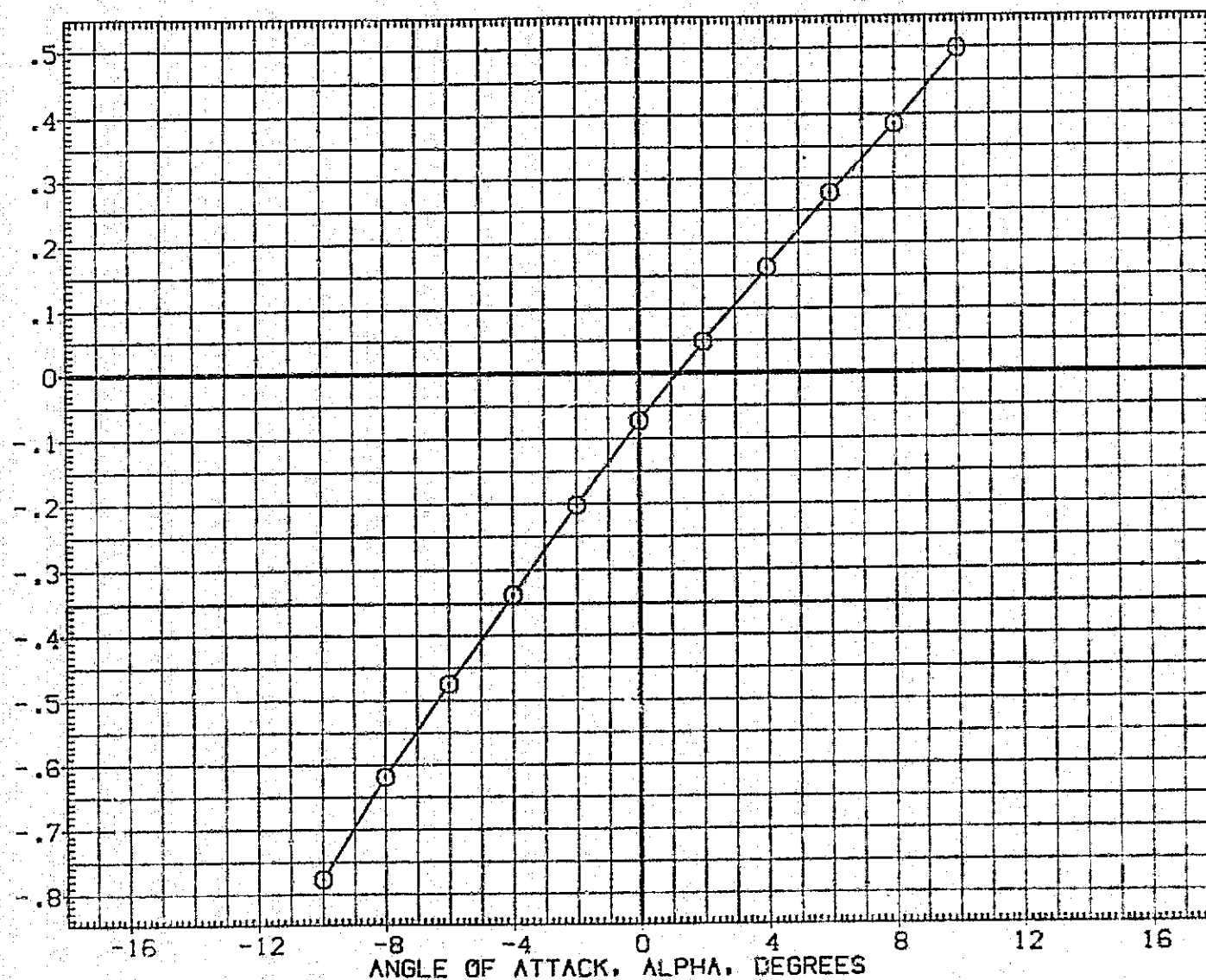


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (F)MACH = 1.46

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(IA33) 740TS (TIPISIP20!) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

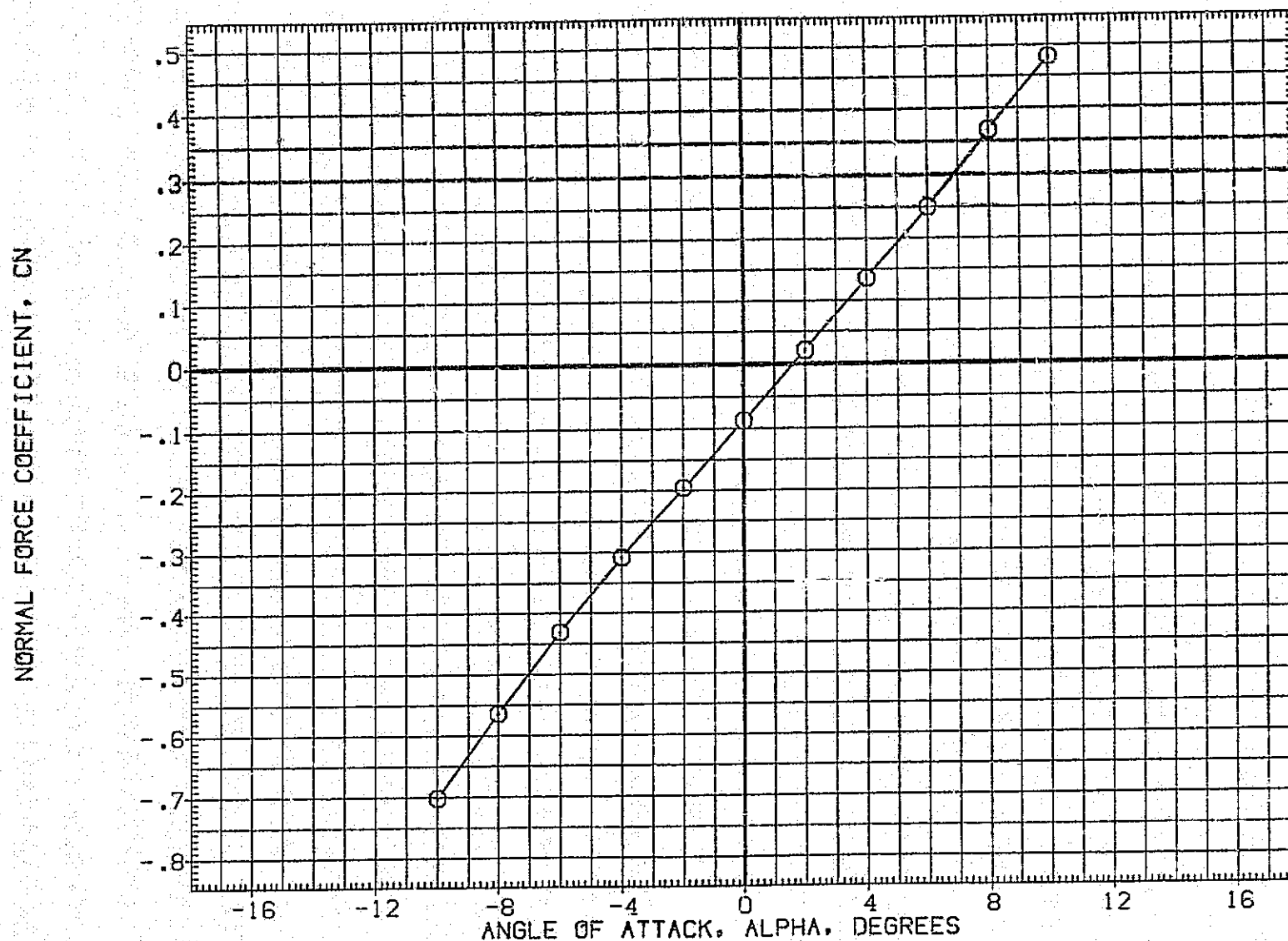


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (G)MACH = 1.96

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STRING
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SO. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

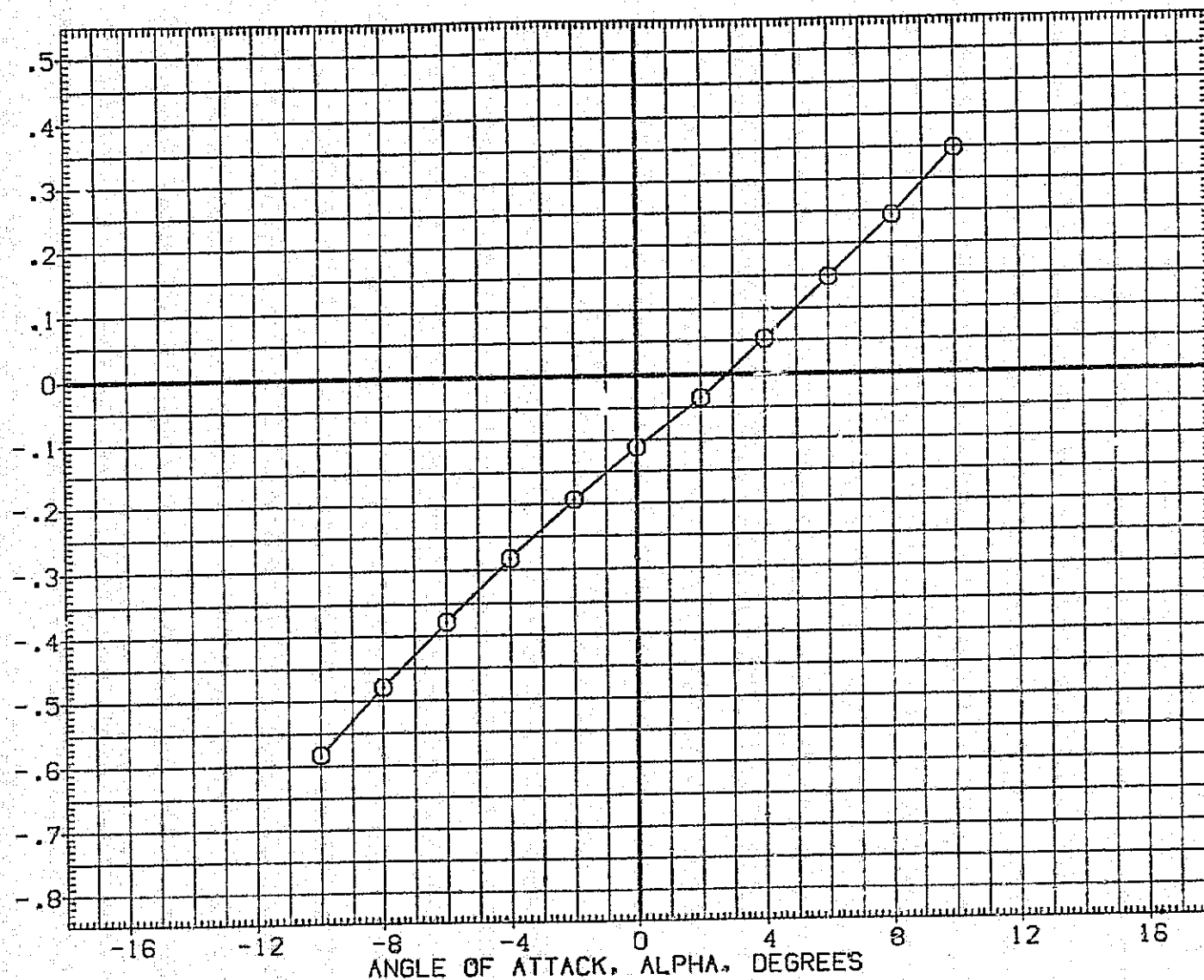


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (H)MACH = 2.99

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33, 740TS (TIPIS1P201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

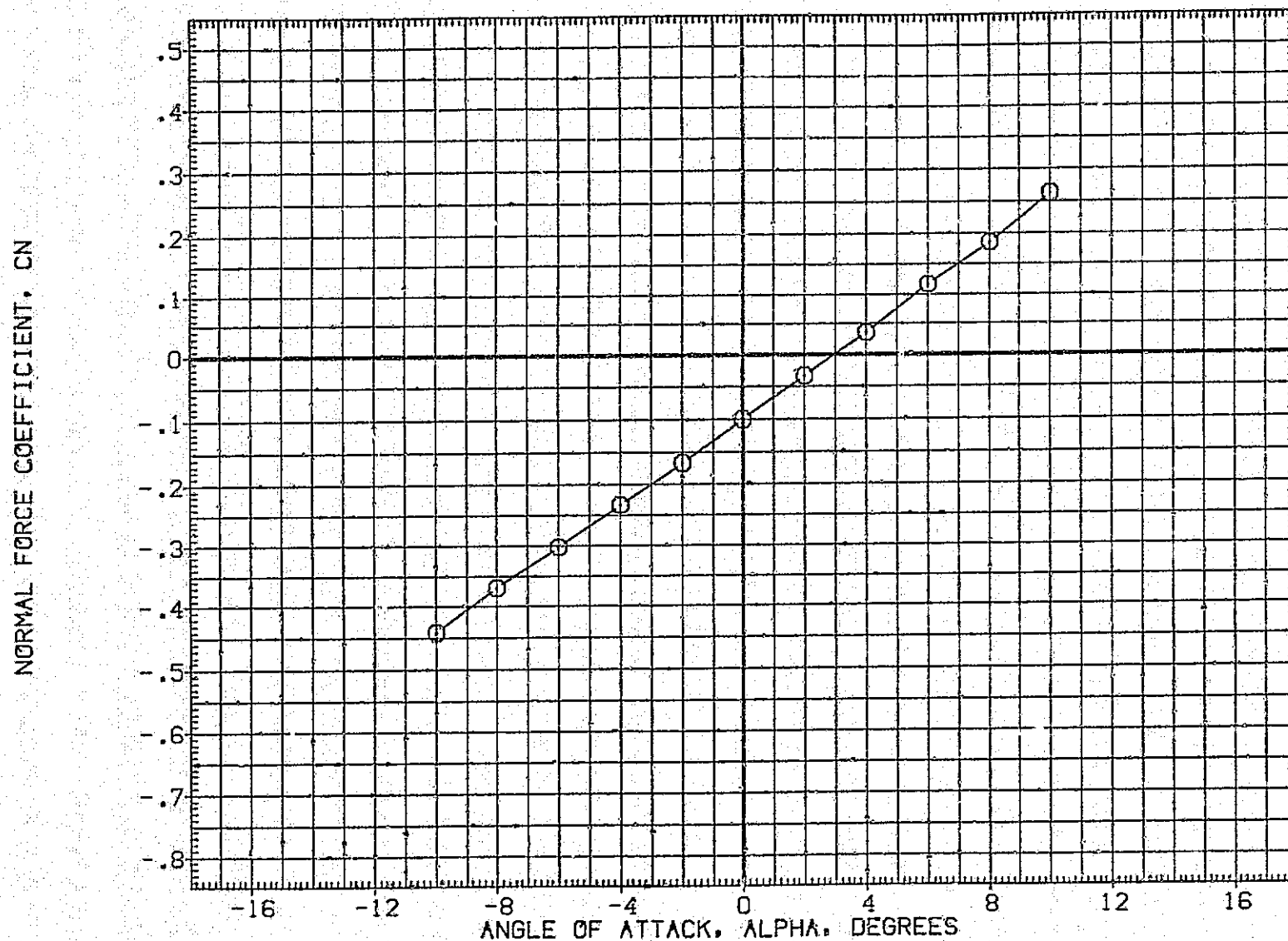


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(1) MACH = 4.96

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(1A33) 740TS (TIP1SIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

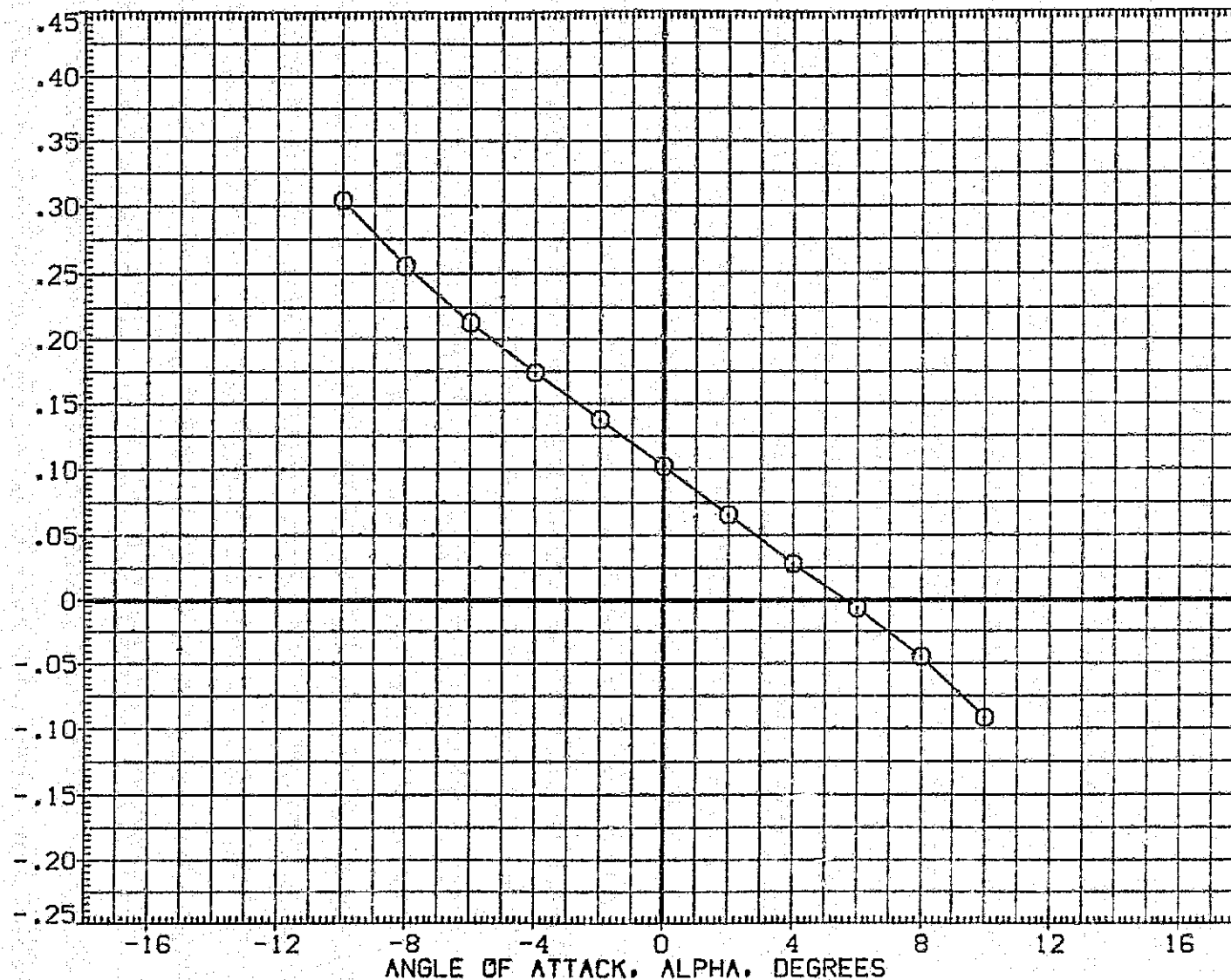


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(A)MACH = .60

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPIS(P201)) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

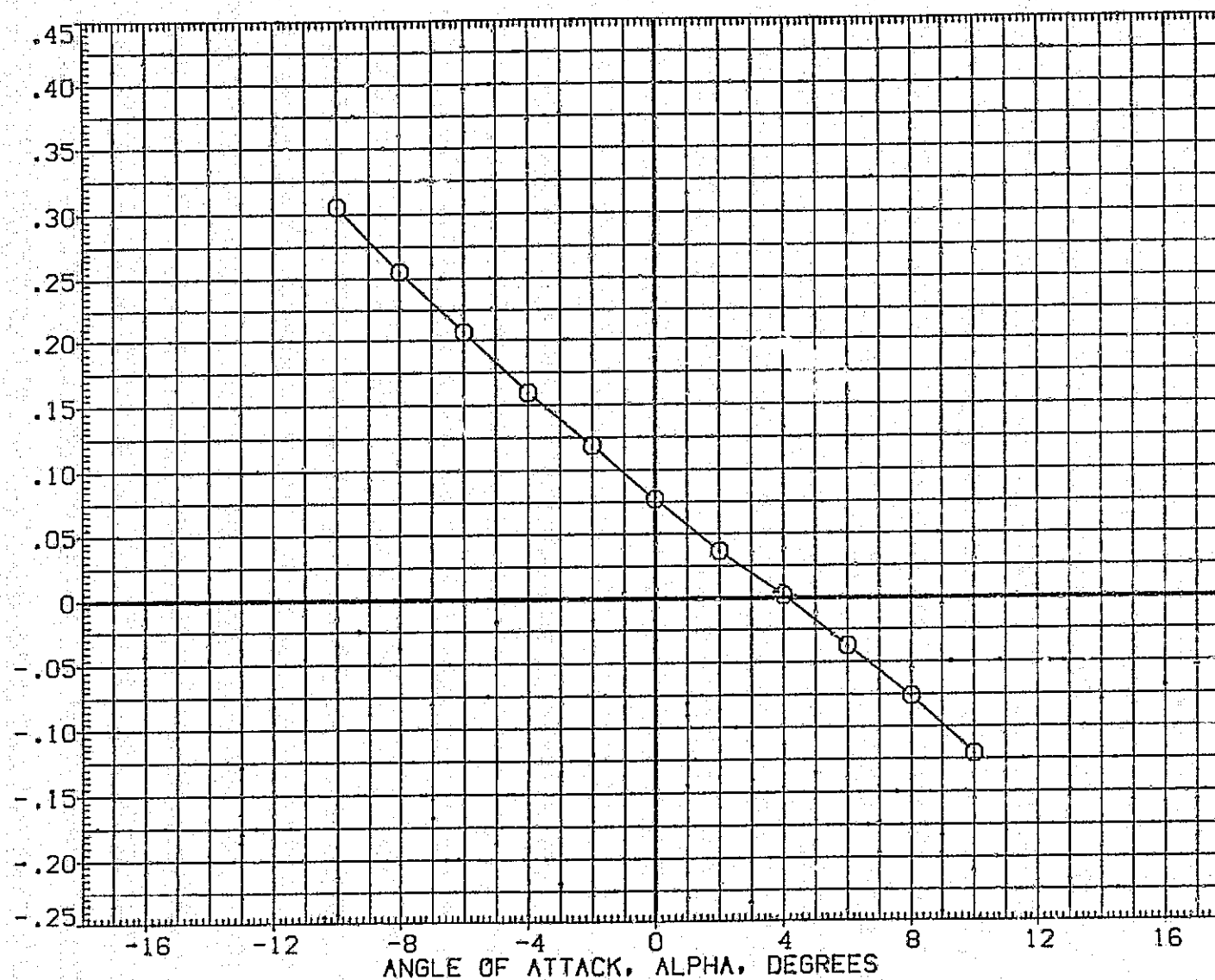


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(B)MACH = .80

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

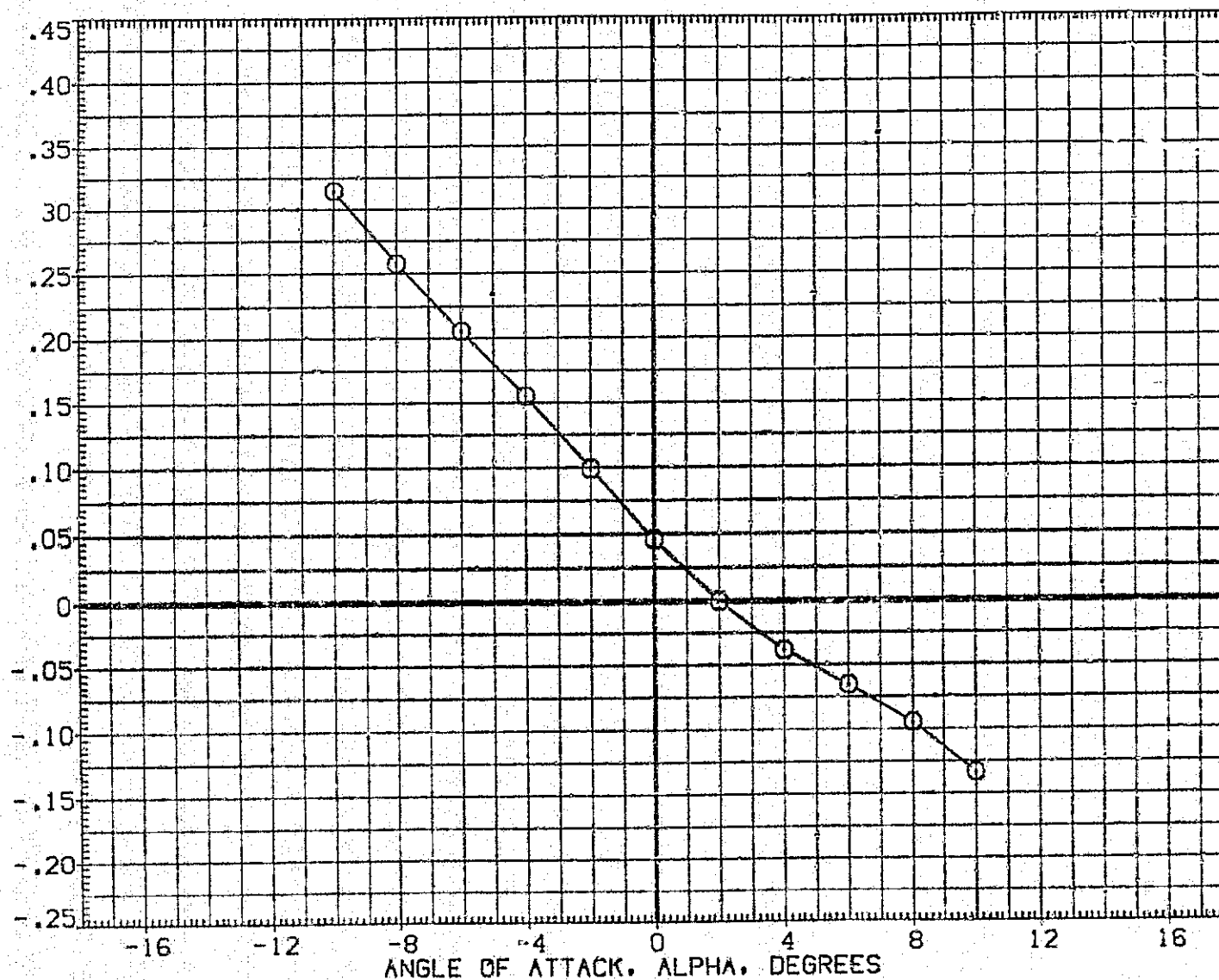


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(C)MACH = .90

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
(VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
SREF 2690.0000 SQ. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

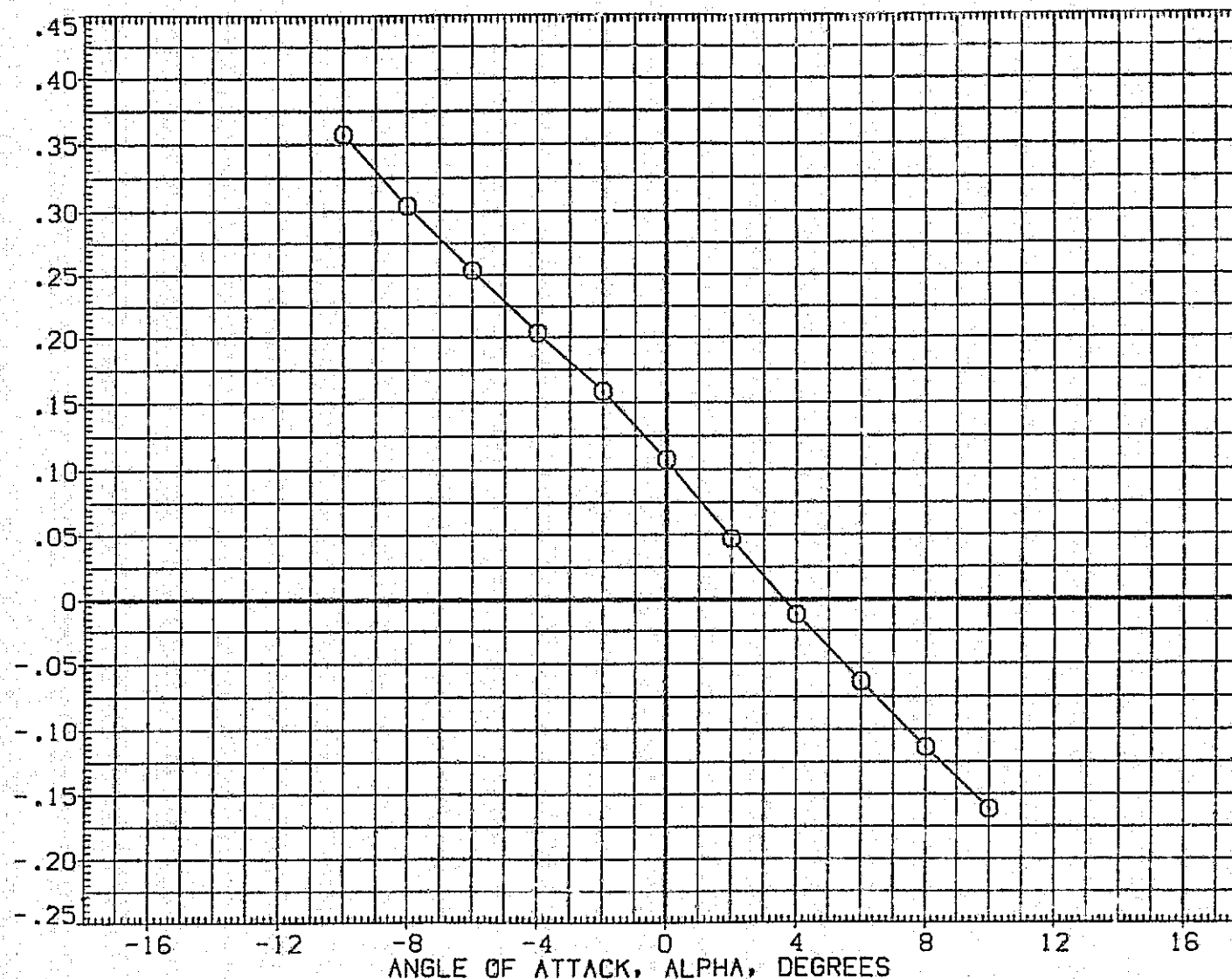


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(D)MACH = 1.10

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) O MSFC 594(1A33) 740TS (TIP1SIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

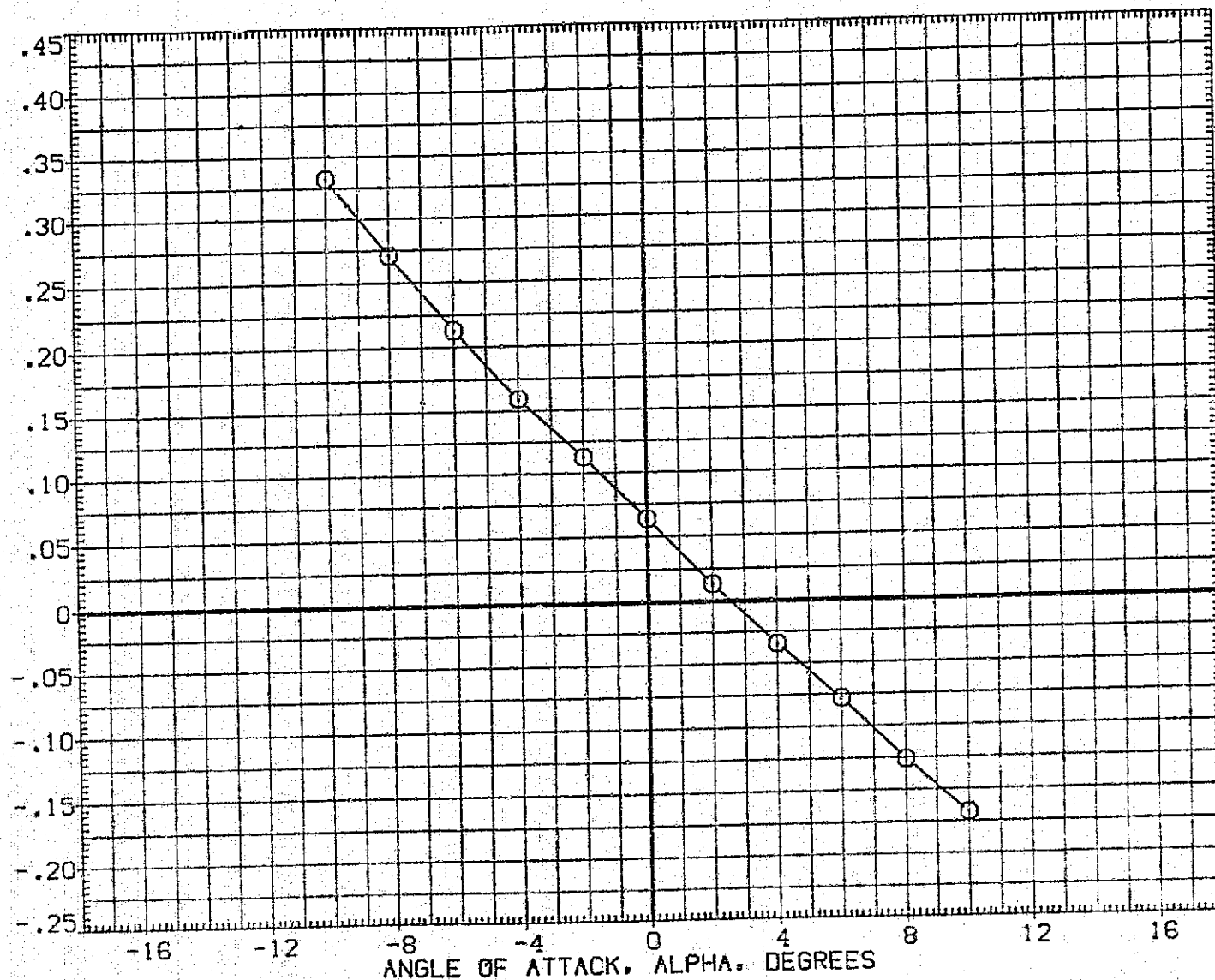


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (C)MACH = 1.25

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(1A33) 740TS (TIP1SIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

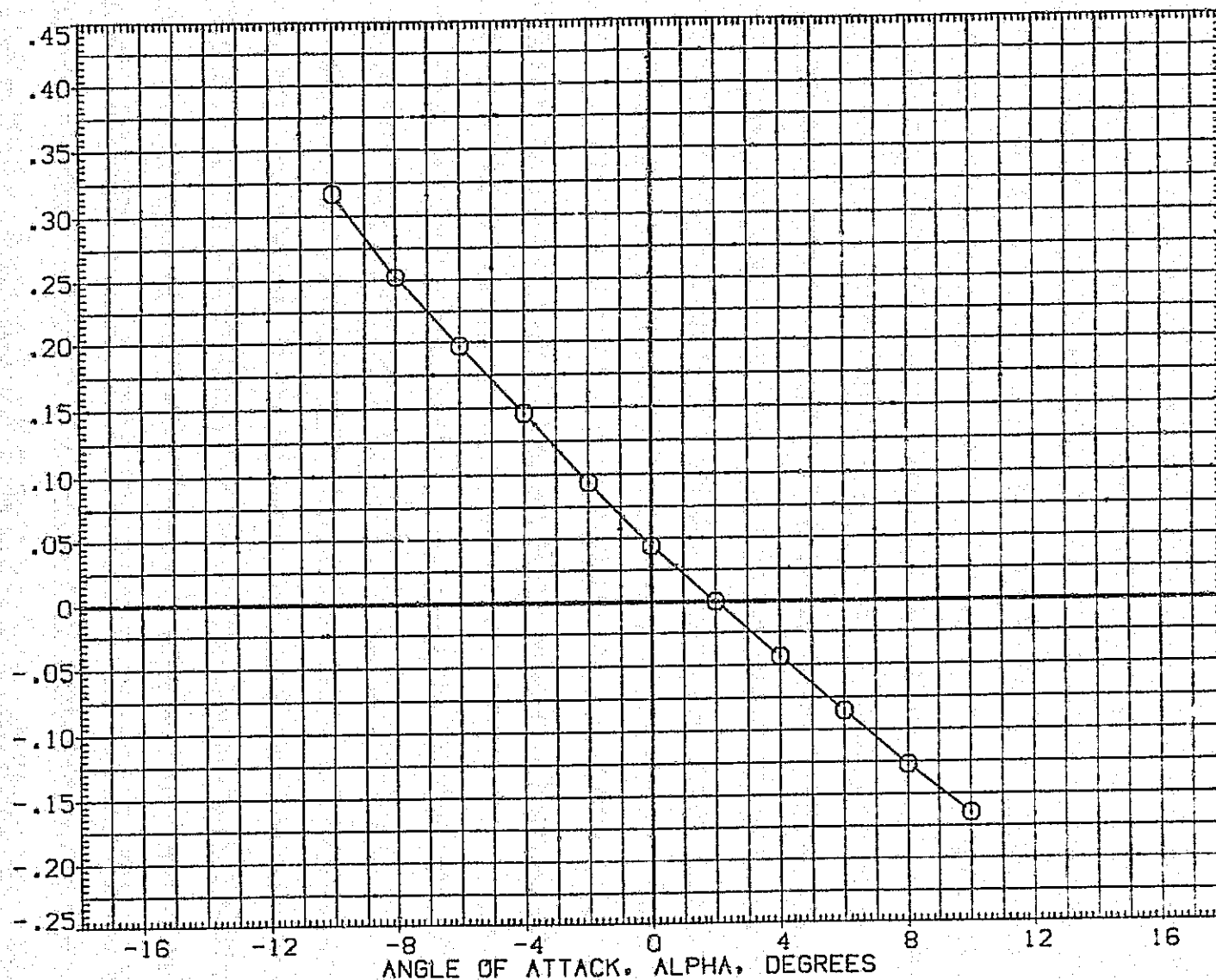


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (F)MACH = 1.46 PAGE 130

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) O MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

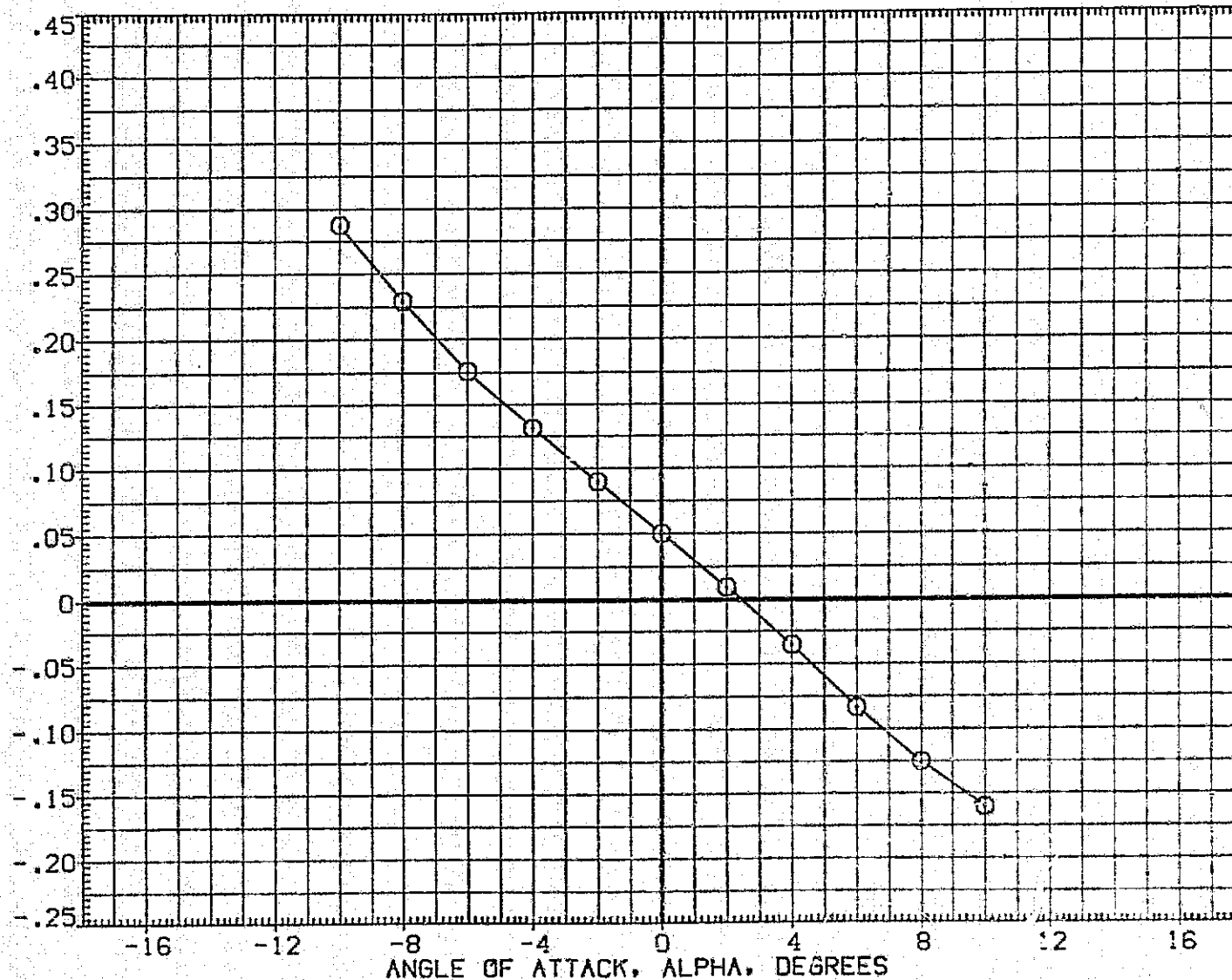


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (G)MACH = 1.96

DATA SET SYMBOL. CONFIGURATION DESCRIPTION
(VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
SREF 2690.0000 SG. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

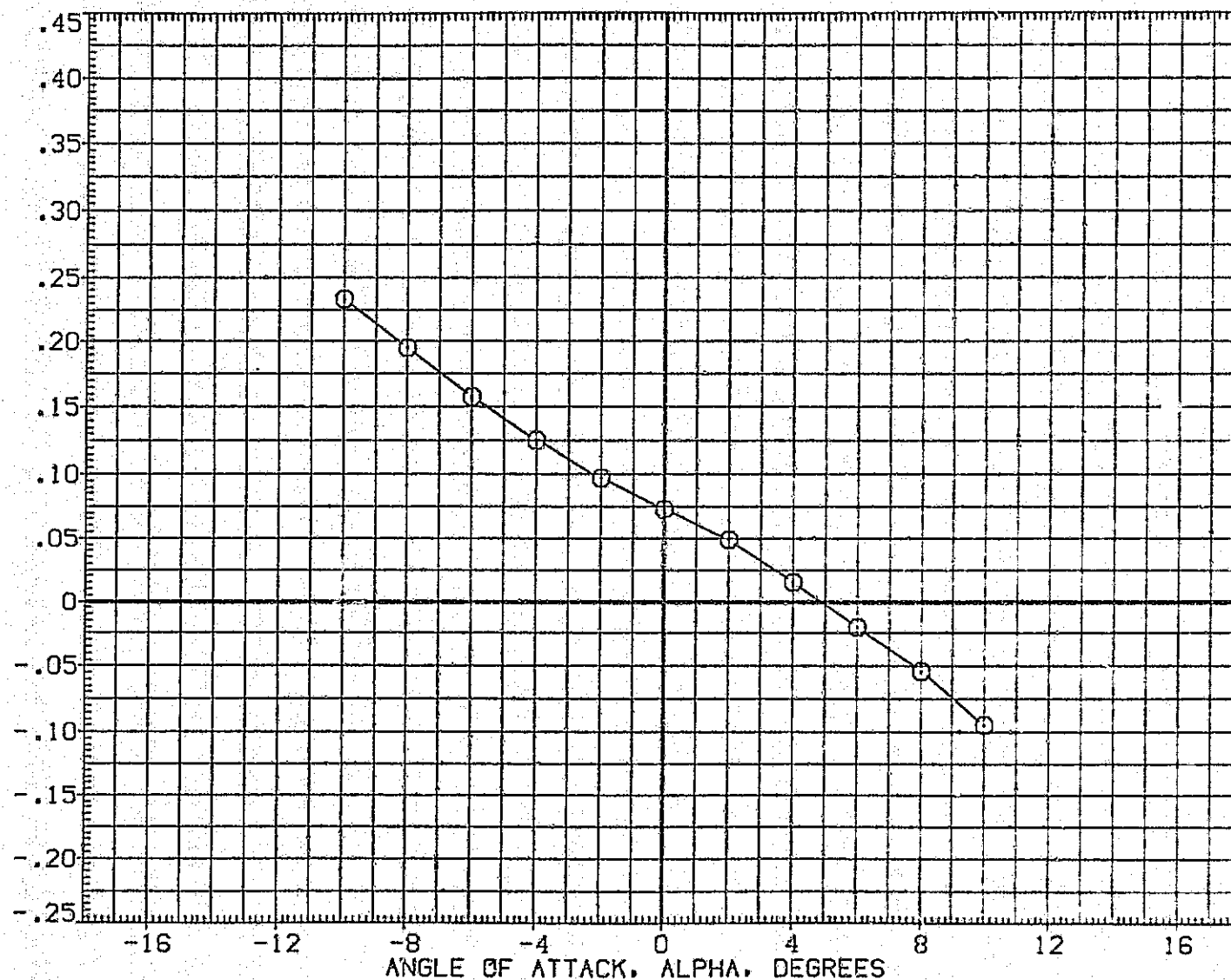


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(H)MACH = 2.99

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
(VIC007) O MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
SREF 2690.0000 SQ. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

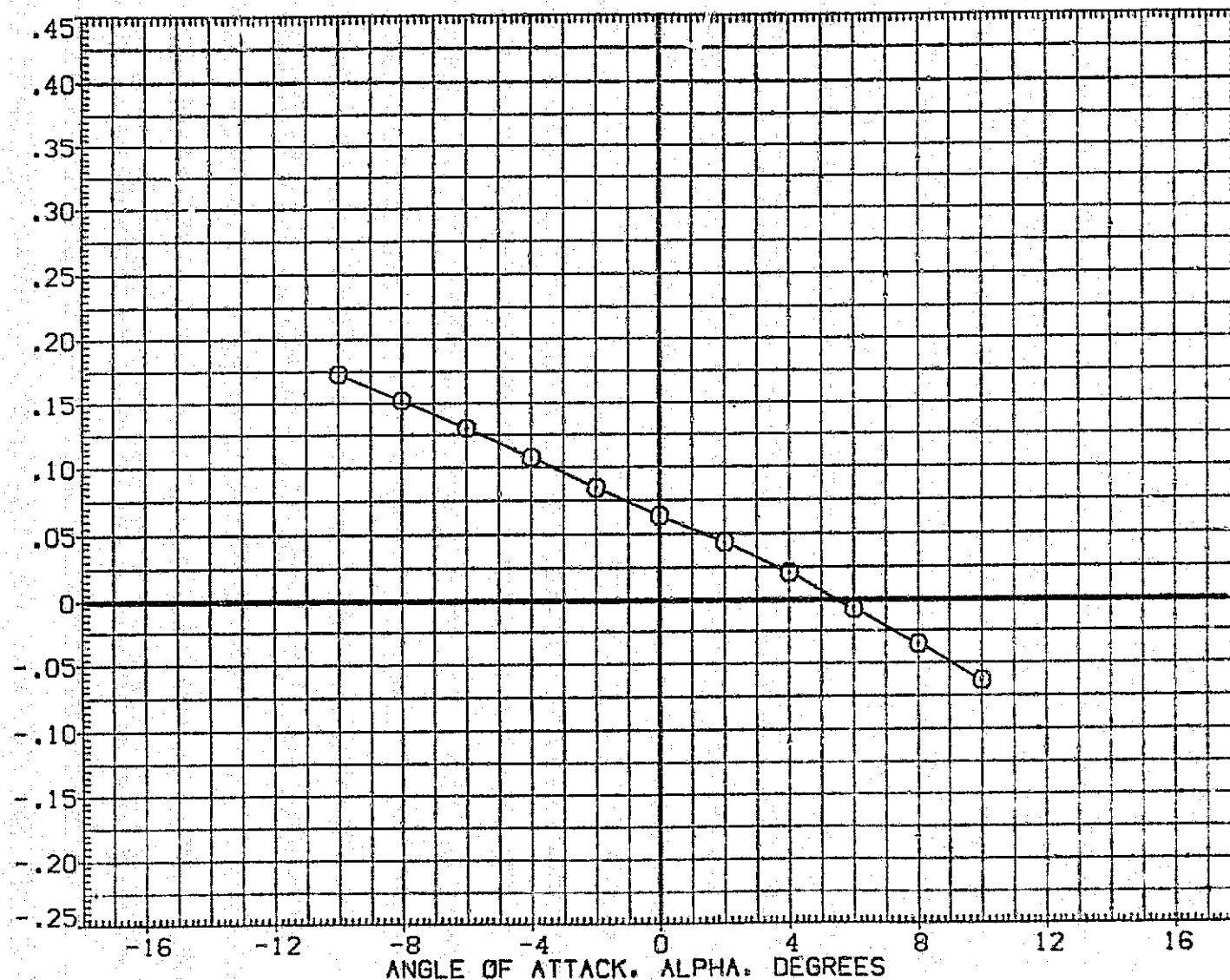


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(M)MACH = 4.96

FOREBODY AXIAL FORCE COEFFICIENT, CAF

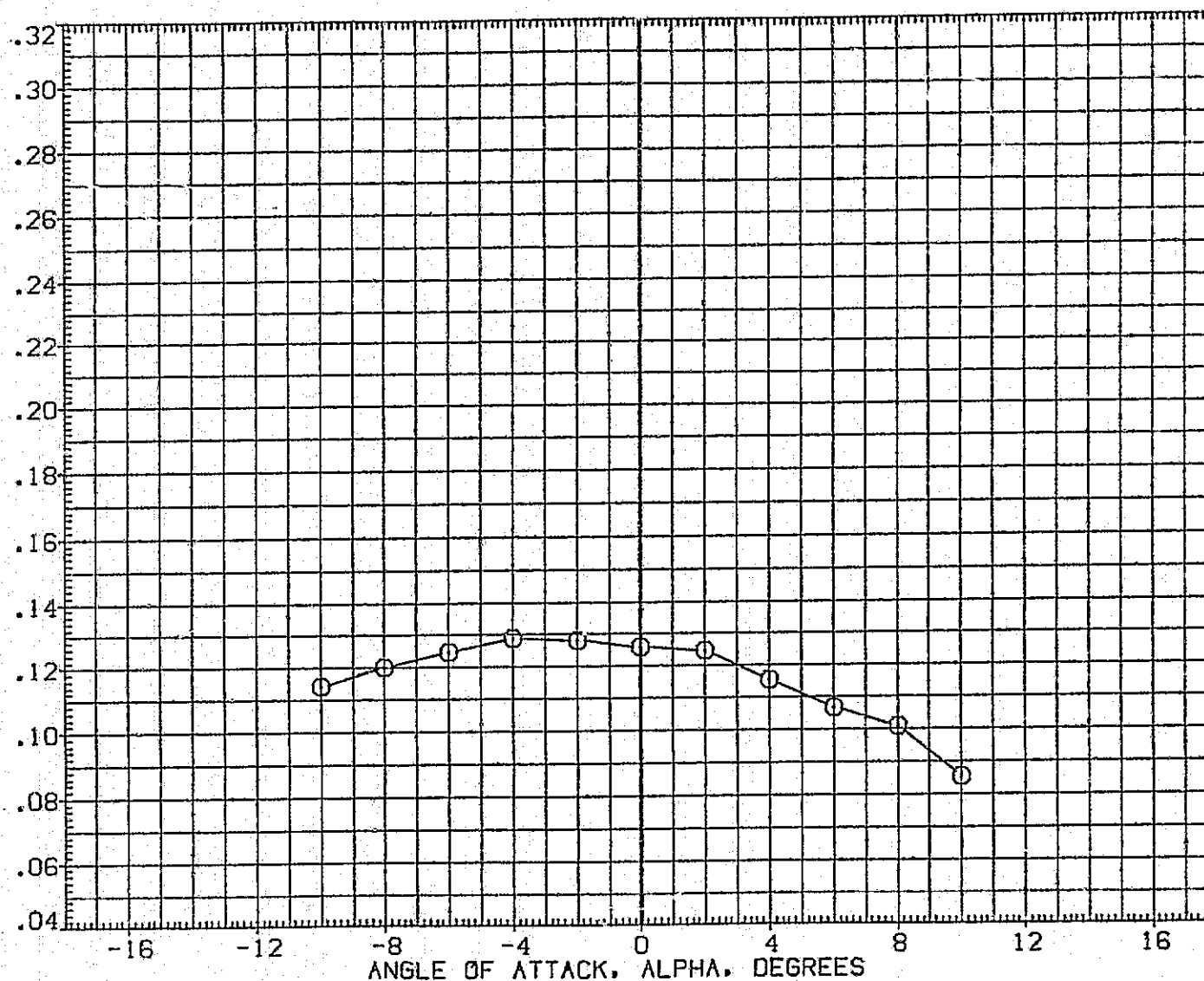


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(A)MACH = .60

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

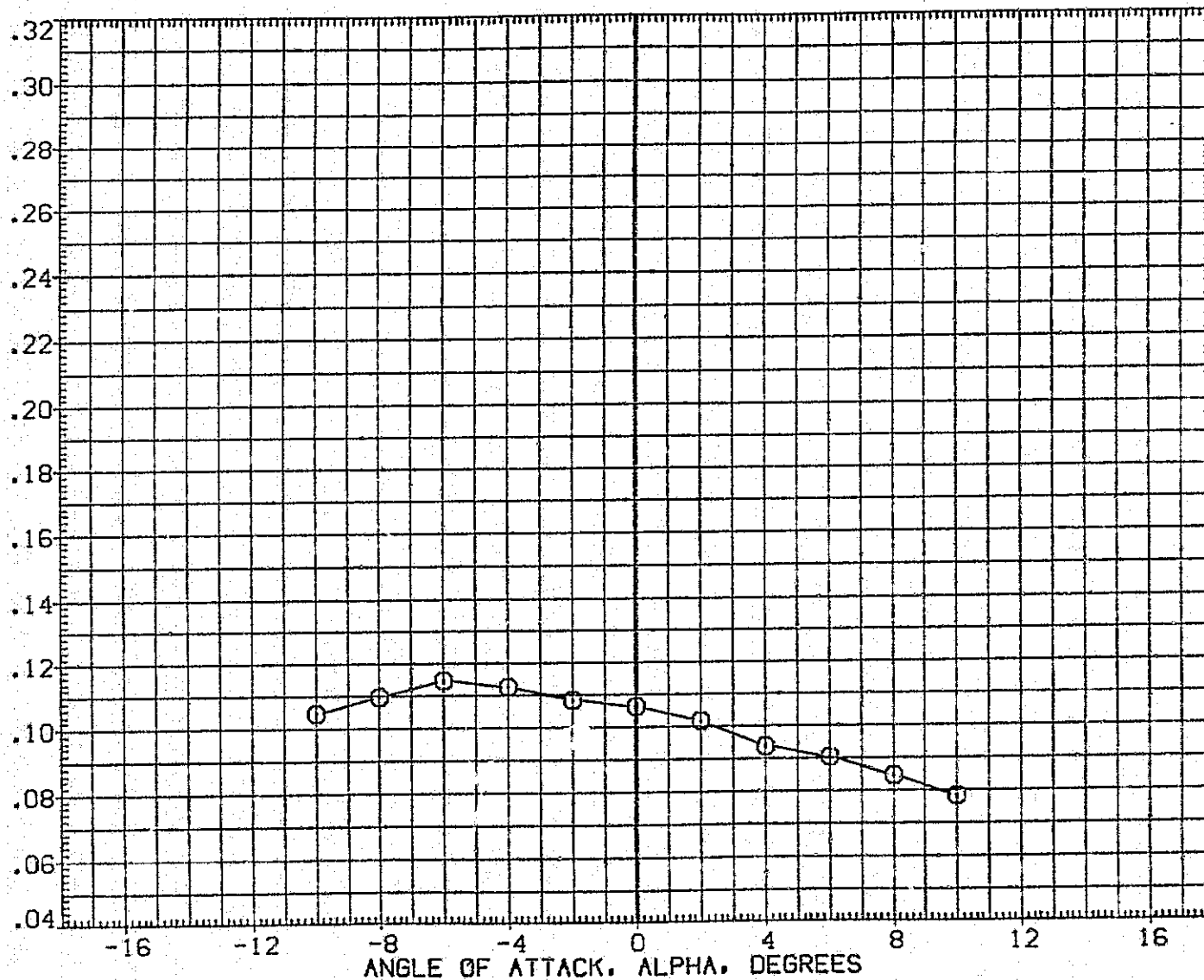


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(B)MACH = .80

FOREBODY AXIAL FORCE COEFFICIENT, CAF

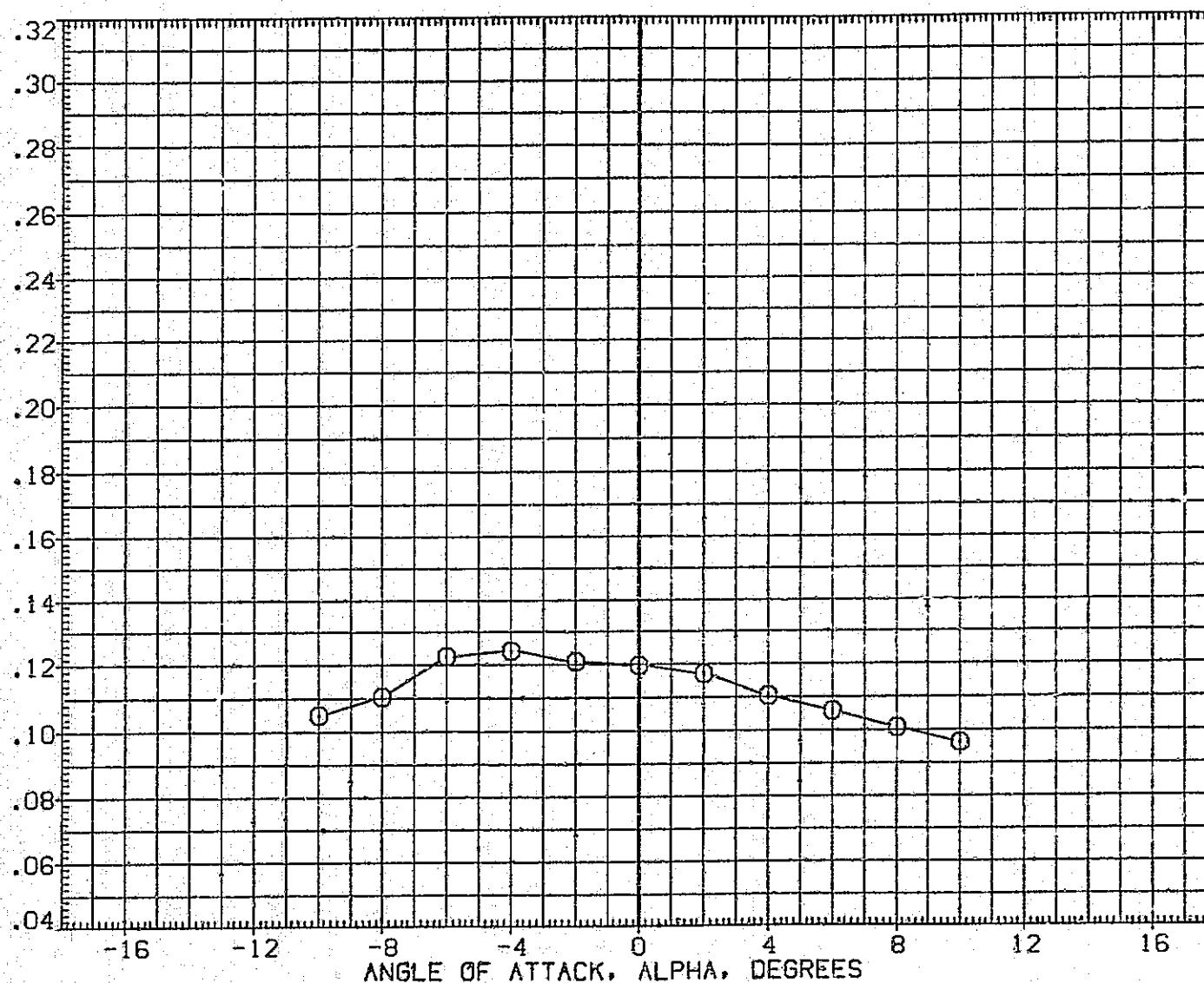


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(C)MACH = .90

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (TIP/SIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XY
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

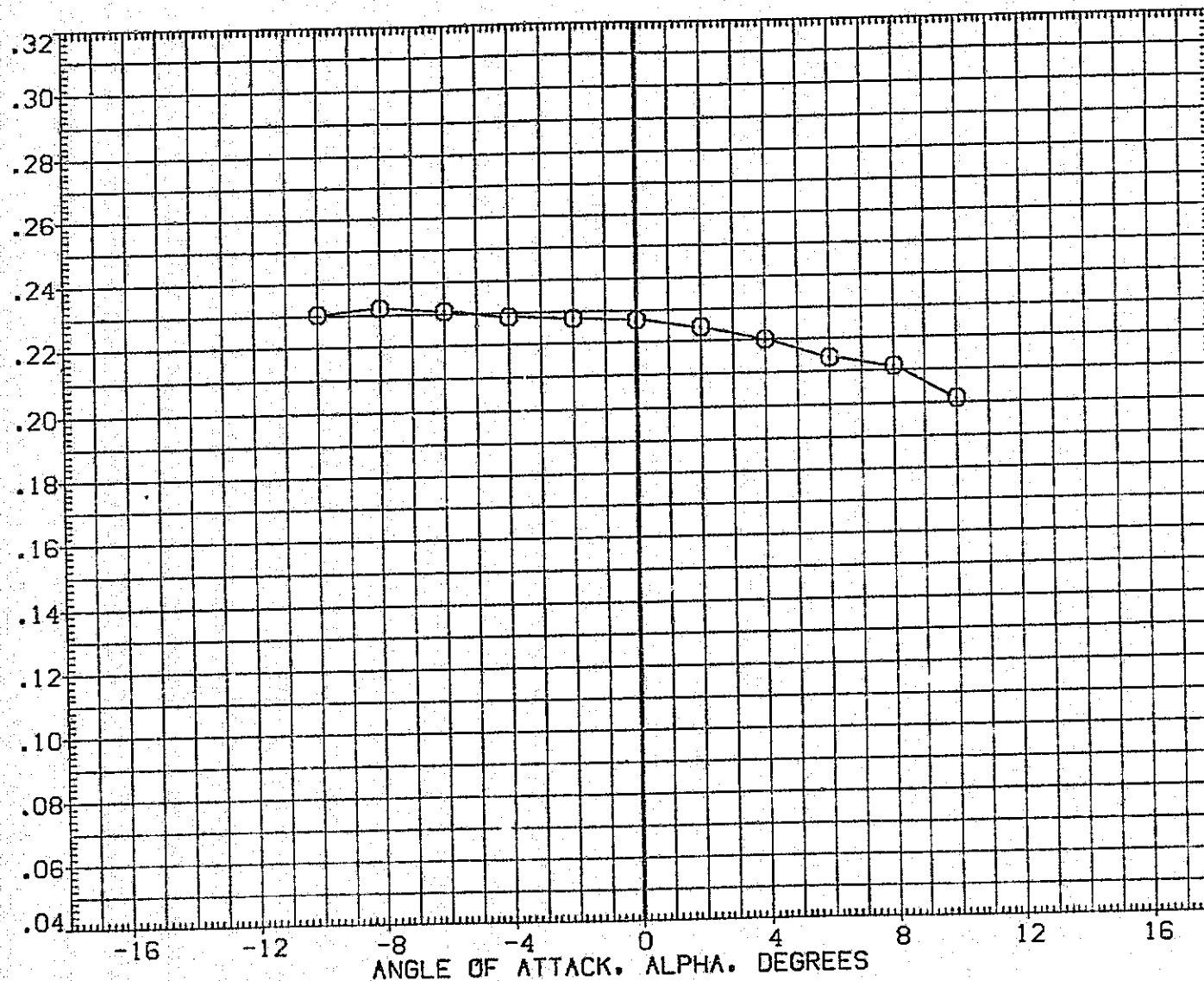


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (CD)MACH = 1.10

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

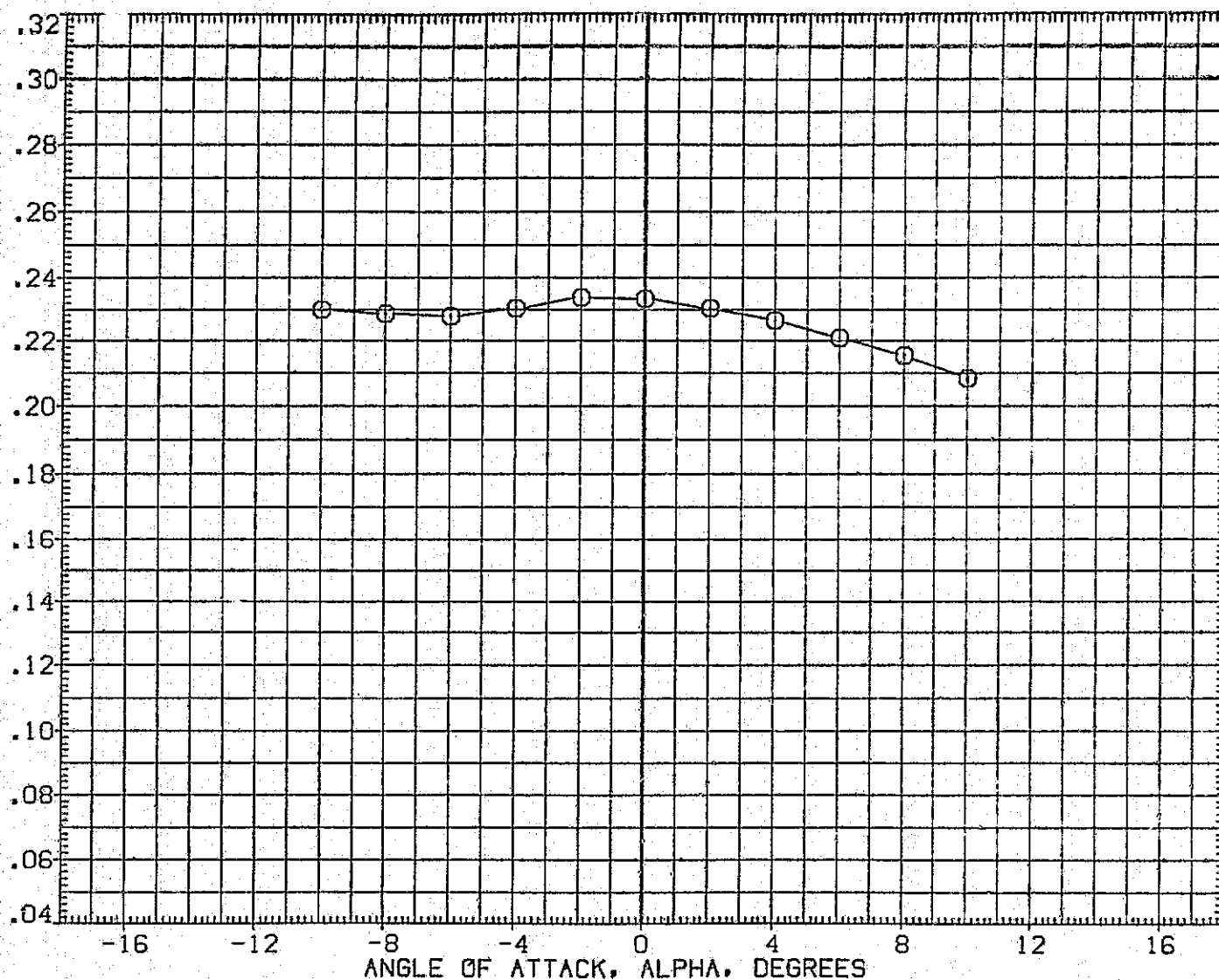


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(E)MACH = 1.25

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) ○ MSFC S94(1A33) 740TS (TIPIS1P201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

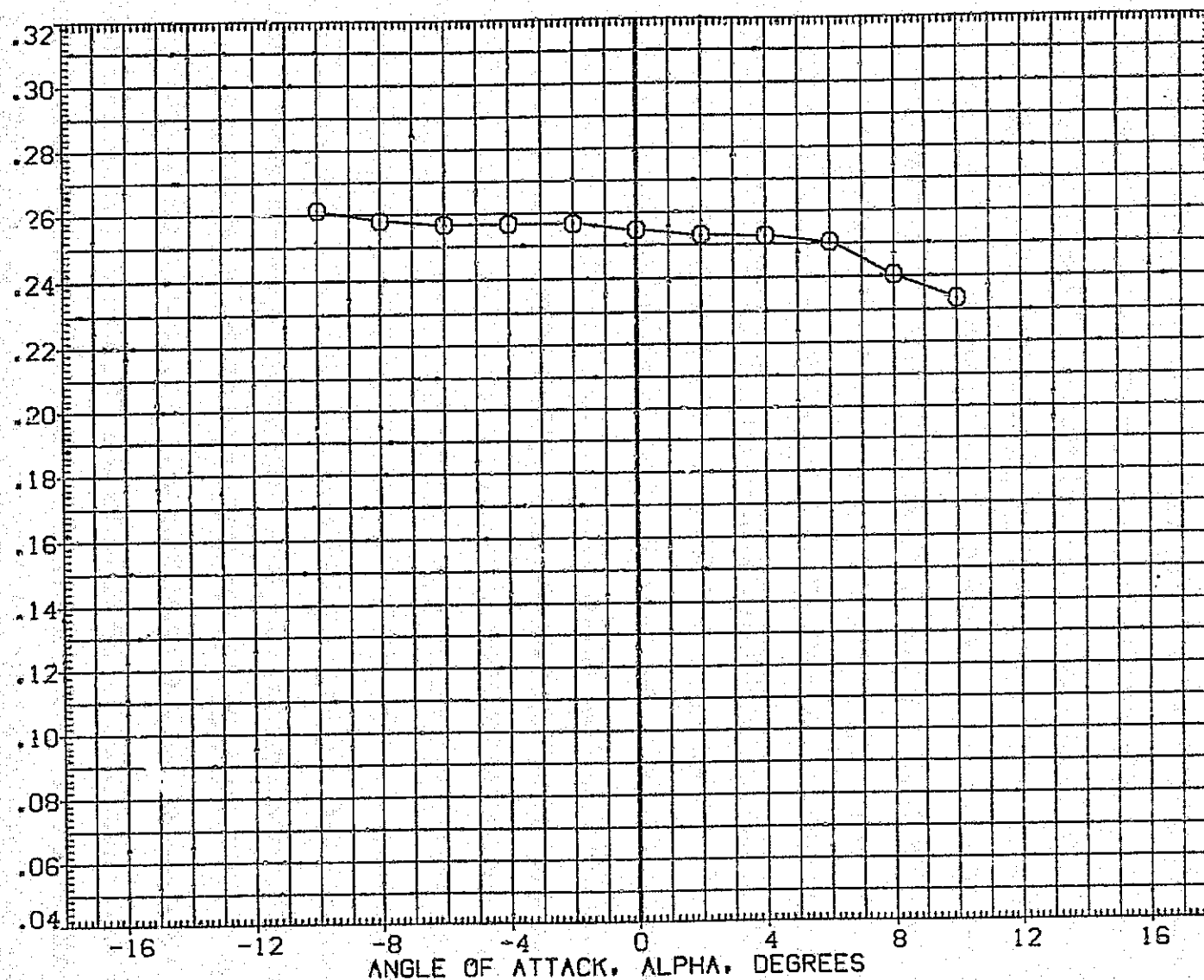


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (F)MACH = 1.46

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, C_{AF}

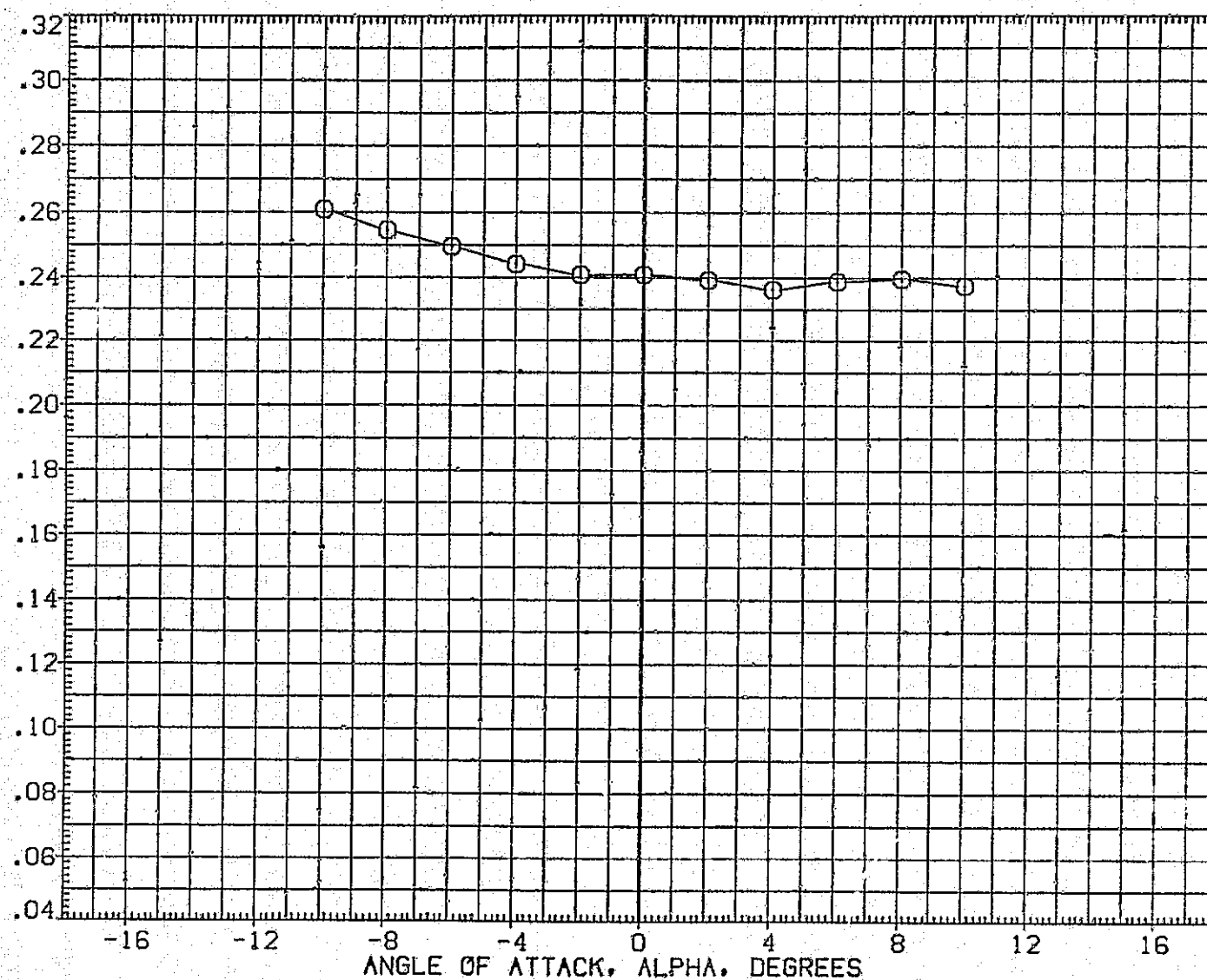


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (G)MACH = 1.96

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
(VIC007) ○ MSFC 594(1A33) 740TS (TIP15IP201)

REFERENCE INFORMATION
SREF 2690.0000 SQ. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

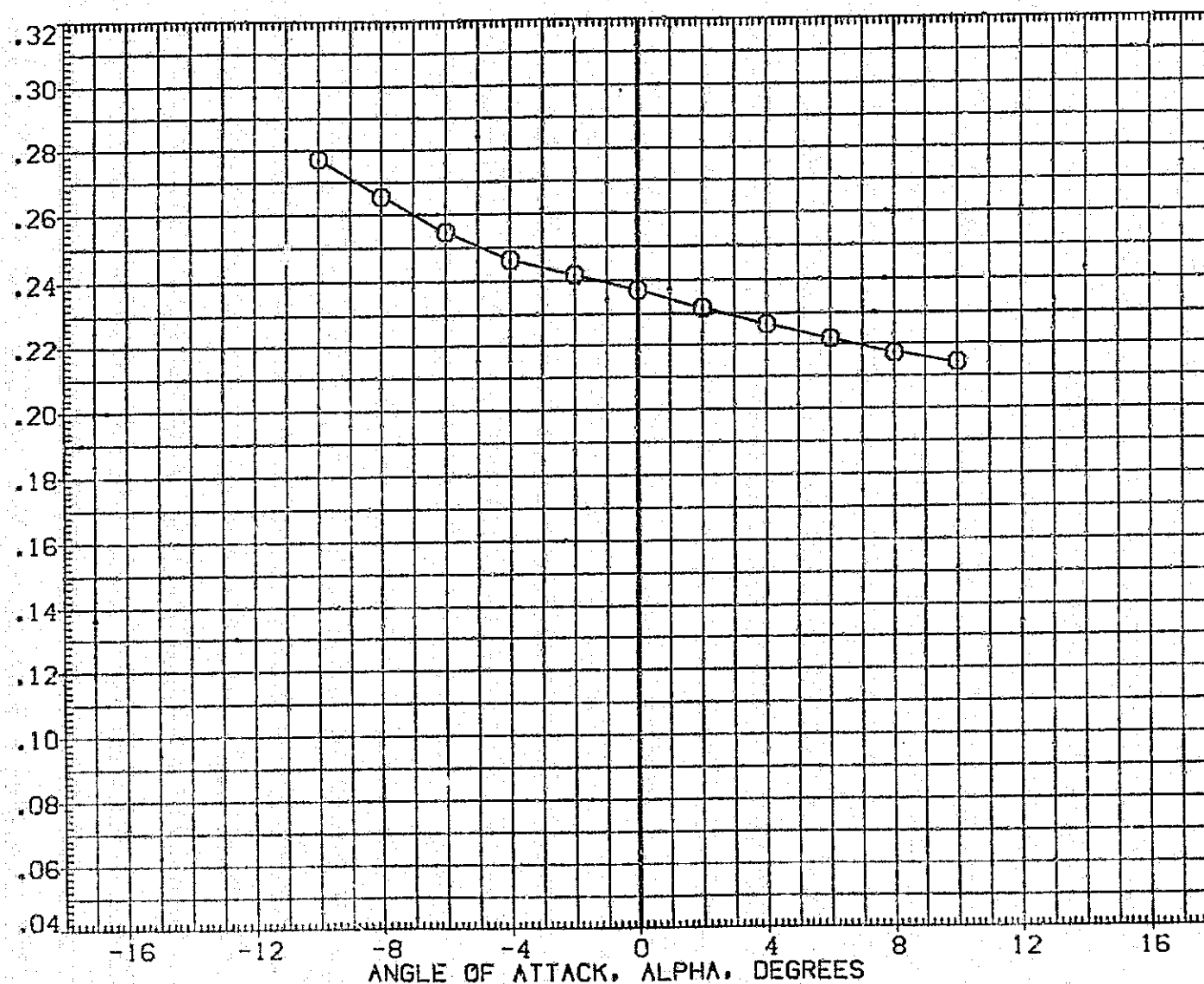


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

CHOMACH = 2.99

PAGE 141

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

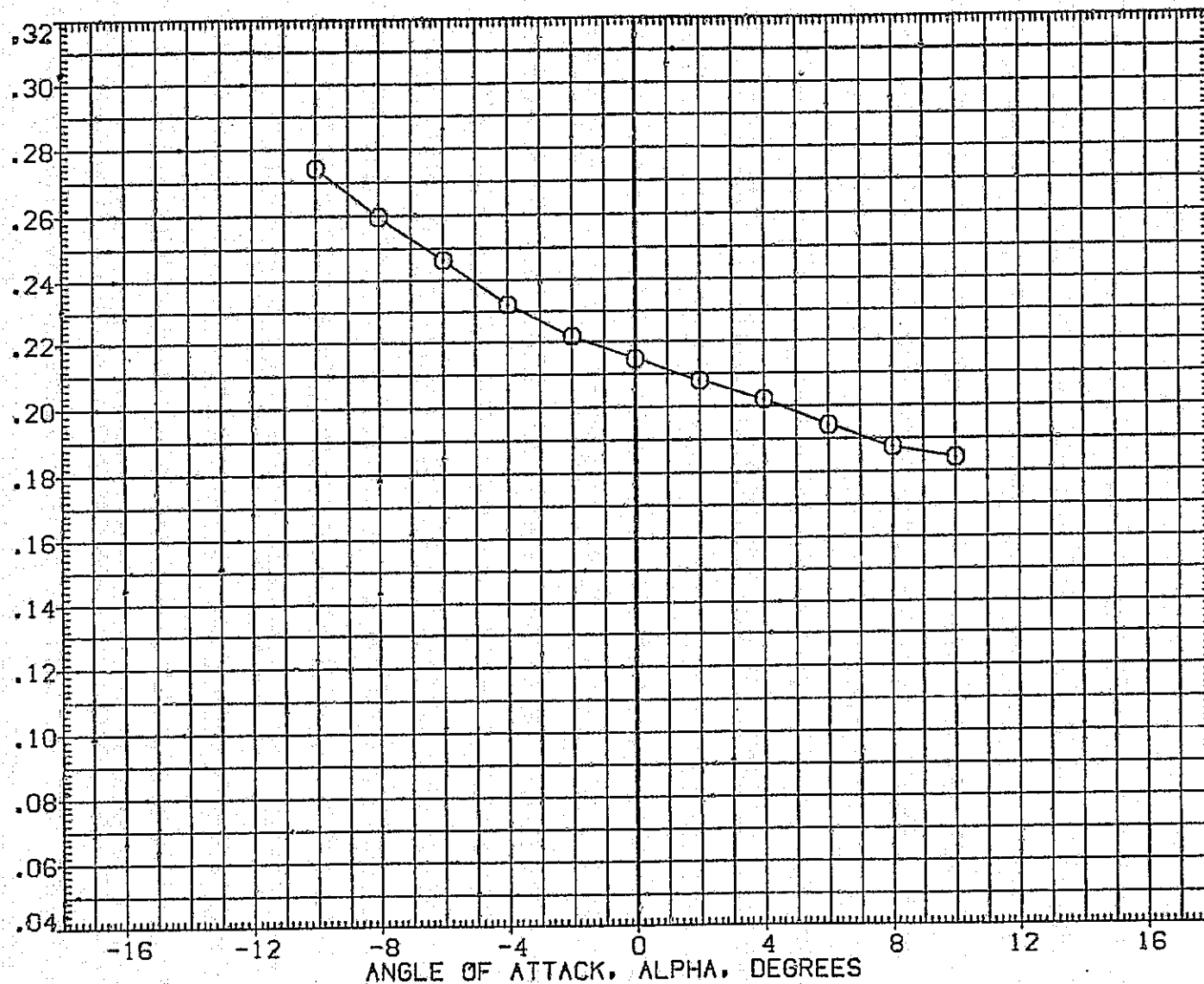


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (1)MACH = 4.96

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 576.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB. ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

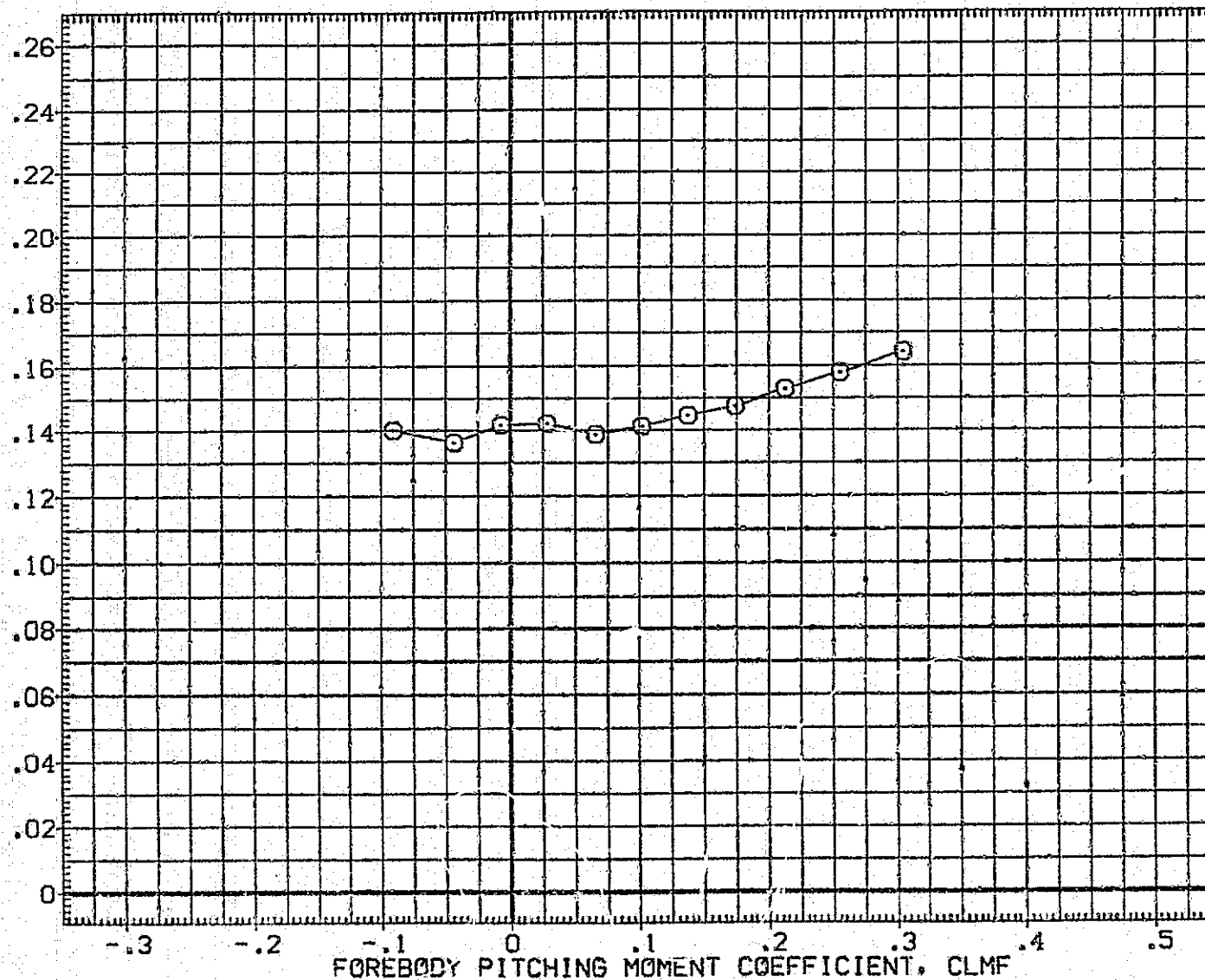


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (A)MACH = .60

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
(VIC007) O MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
SREF 2690.0000 SQ. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

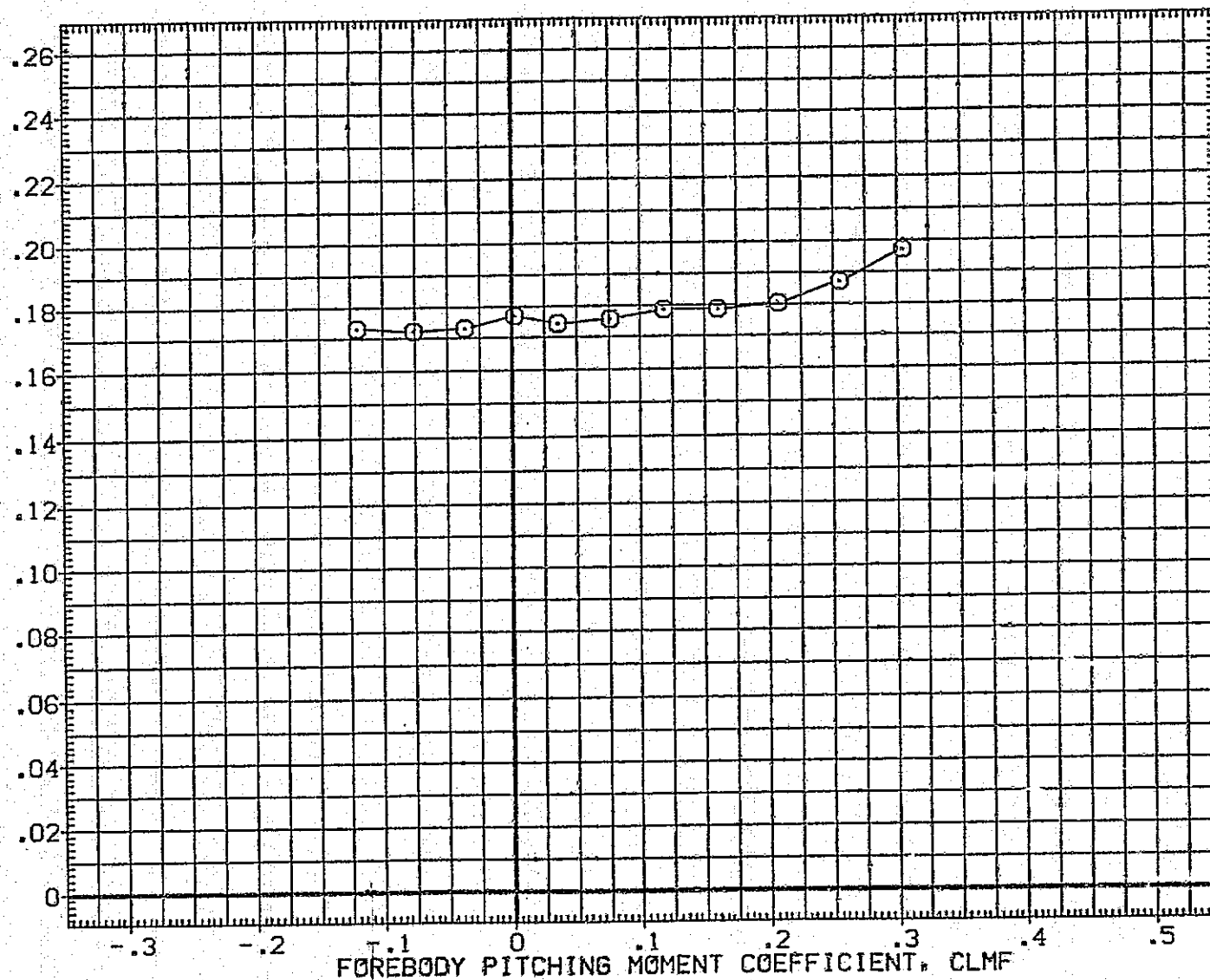


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(B)MACH = .80

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

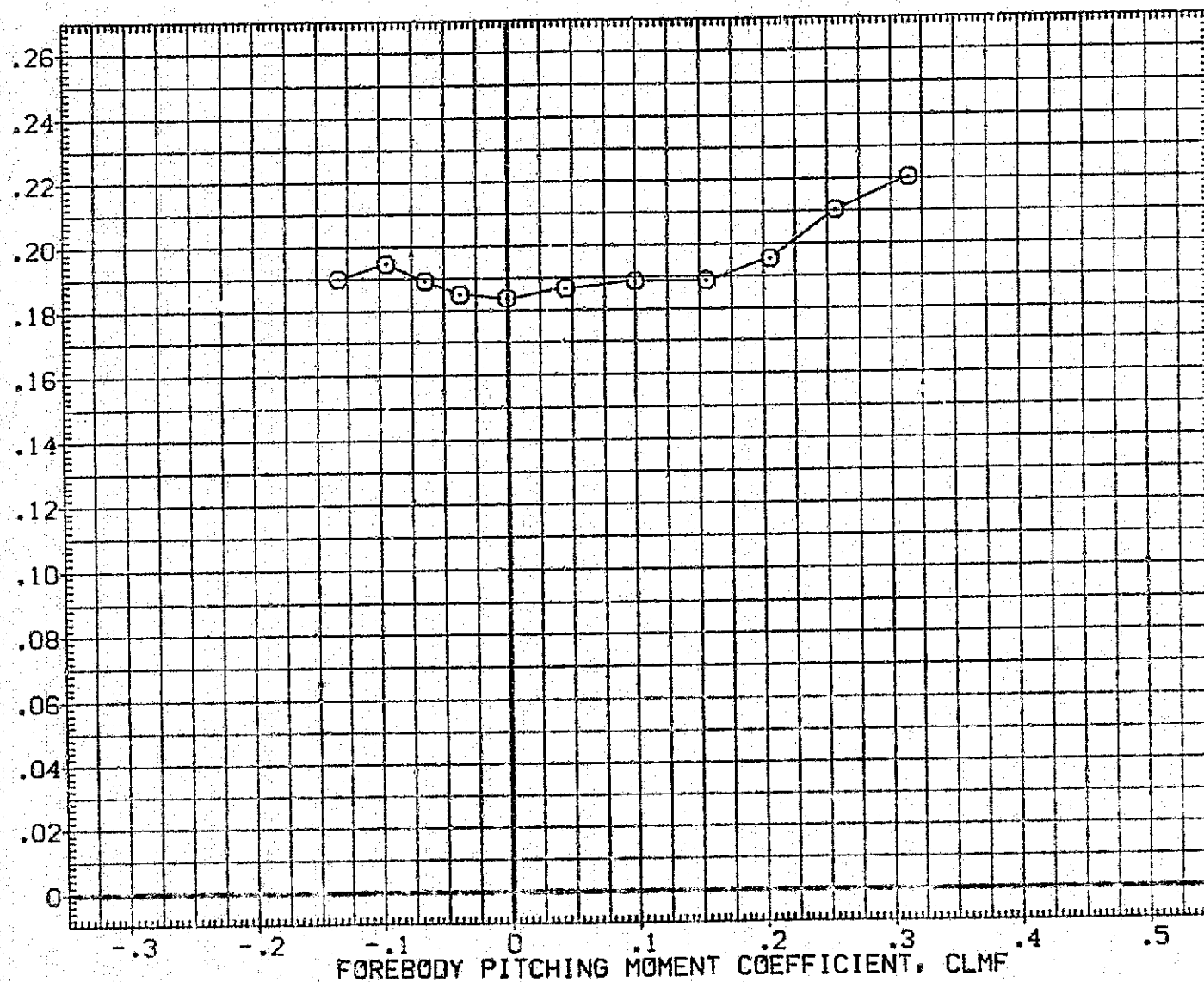


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (C)MACH = .90

DATA SET SYMBOL: CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

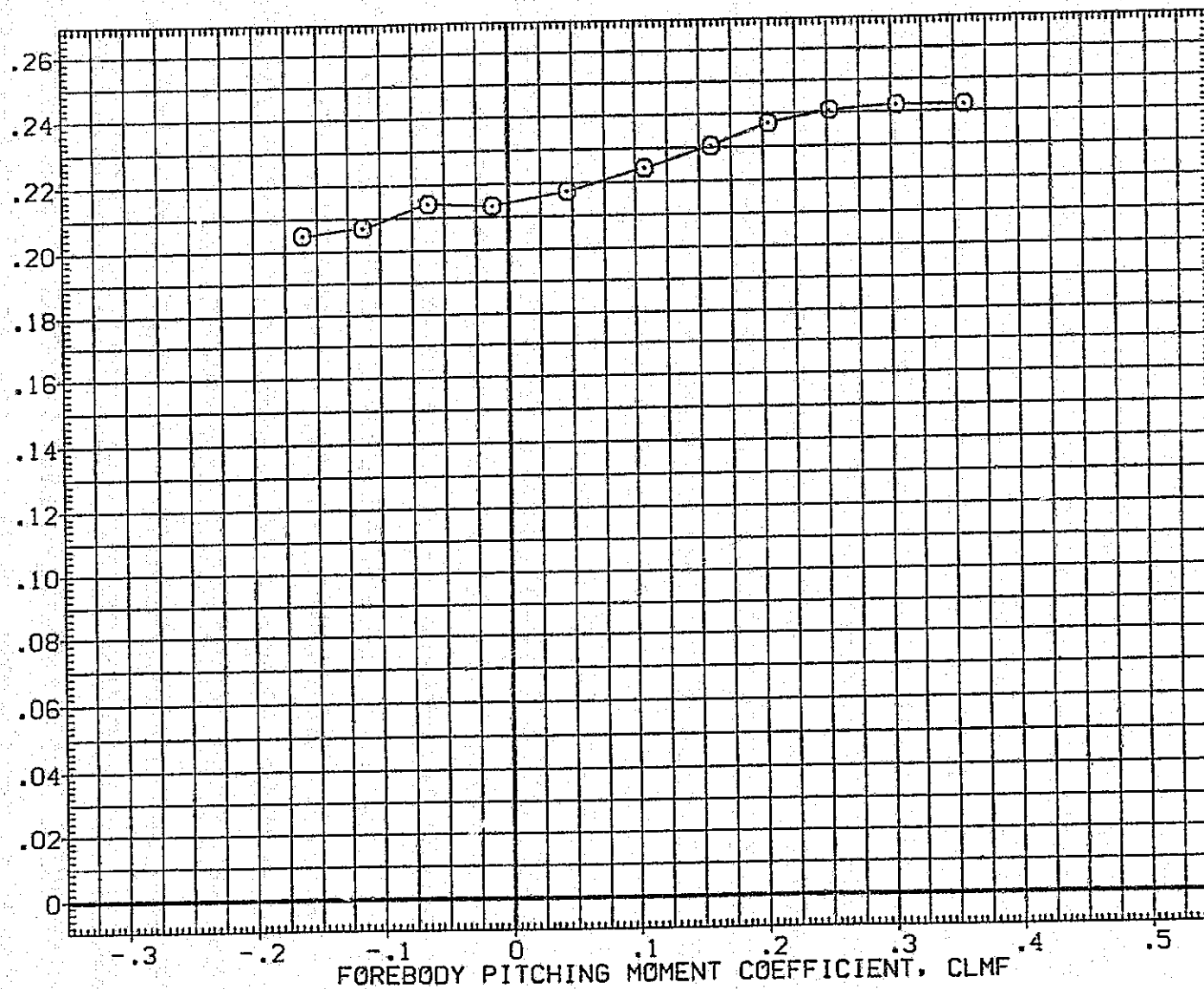


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (D)MACH = 1.10

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

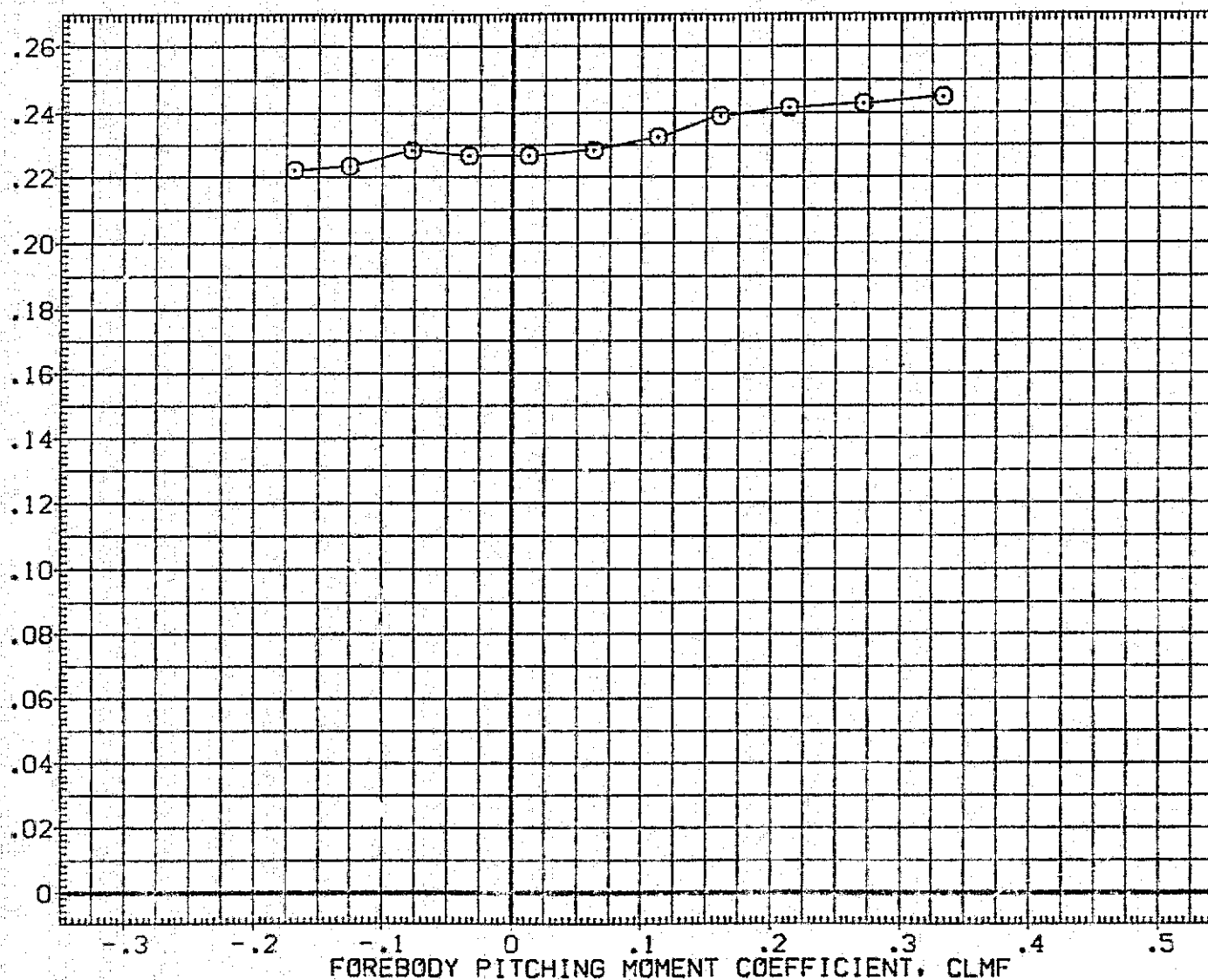


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(E)MACH = 1.25

DATA SET SYMBOL CONFIGURATION DESCRIPTION
(VIC007) O MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
SREF 2690.0000 SQ. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0040

SUM OF THE ORB. ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

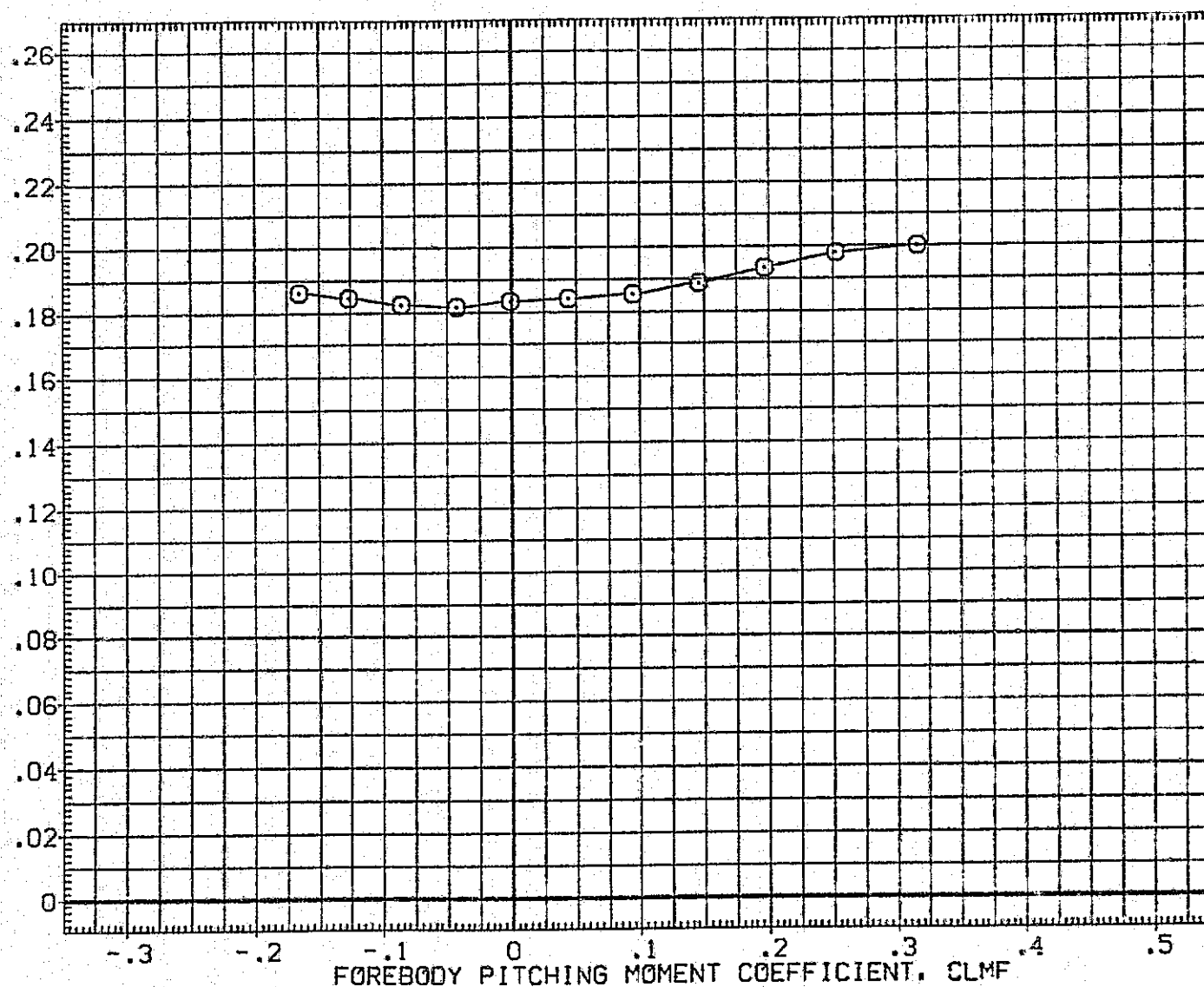


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, $\beta = 0$ DEG

(F)MACH = 1.46

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) ○ MSFC 594(1A33) 740TS (TIP1SIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB. ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

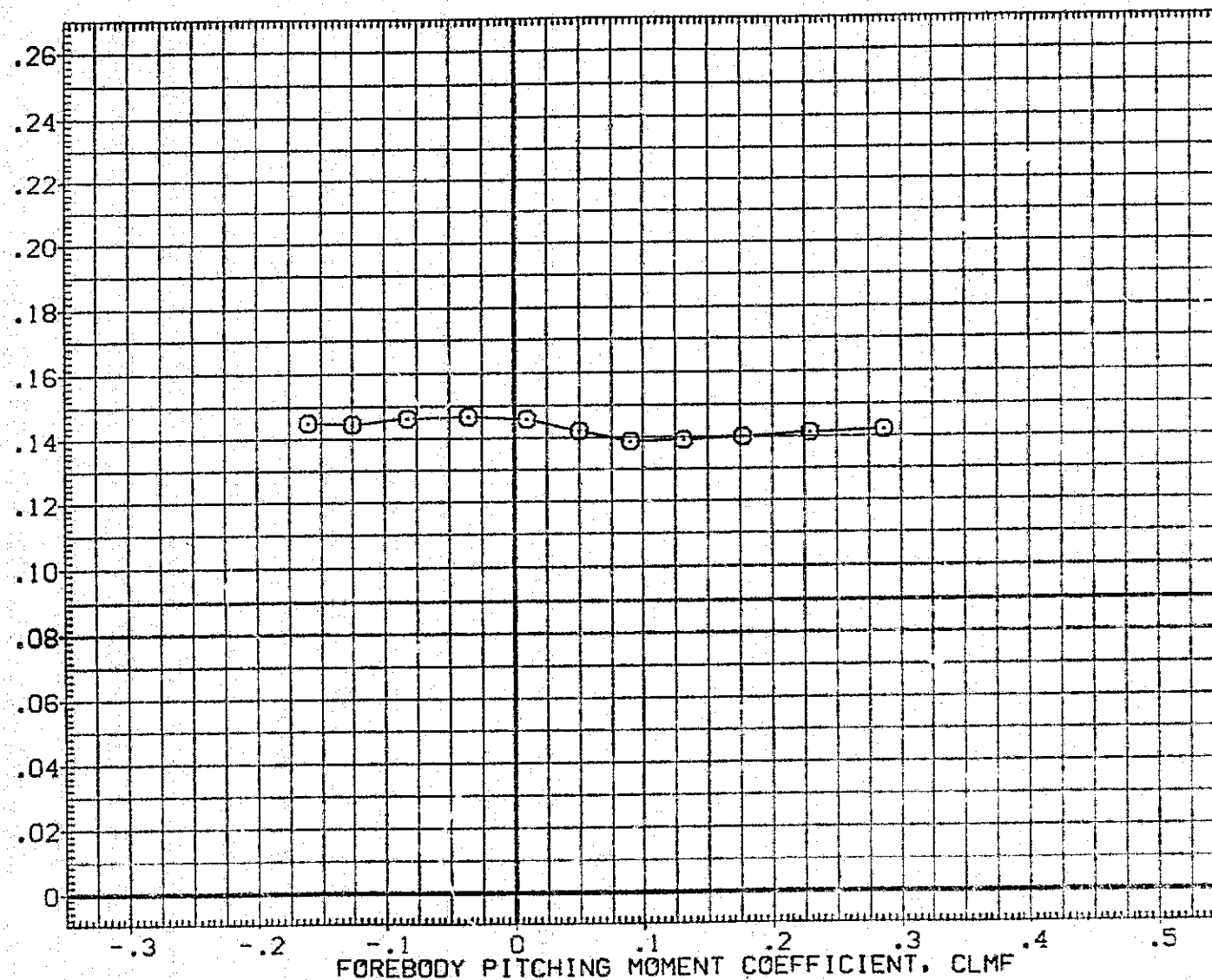


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (G)MACH = 1.96

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) O MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

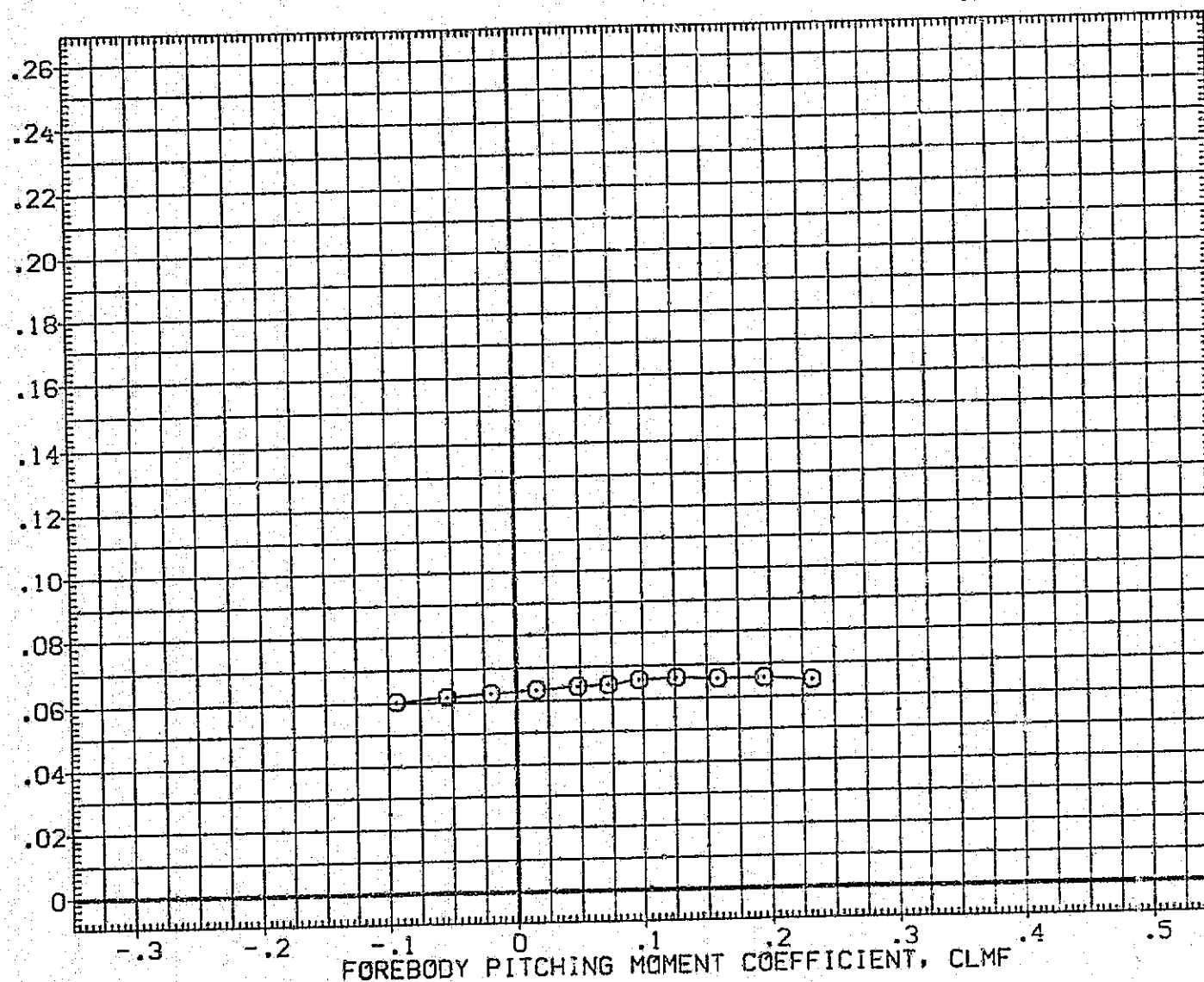


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (H)MACH = 2.99

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) ○ MSFC 594(1A33) 740TS (T1P1S1P201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

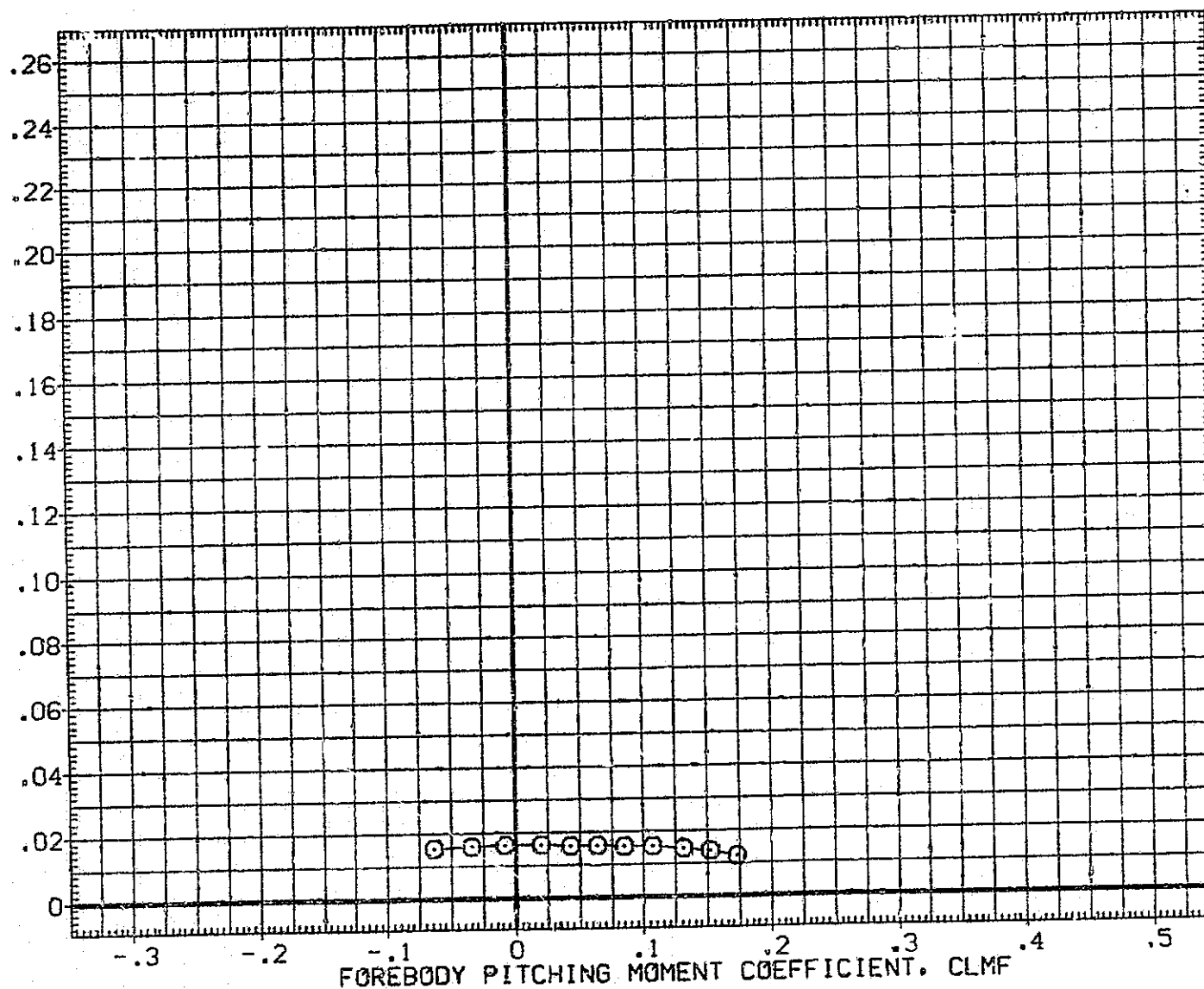


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (1)MACH = 4.96

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORG STINS
 (VIC007) ○ MSFC 594(1A33) 740TS (TIP)SIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

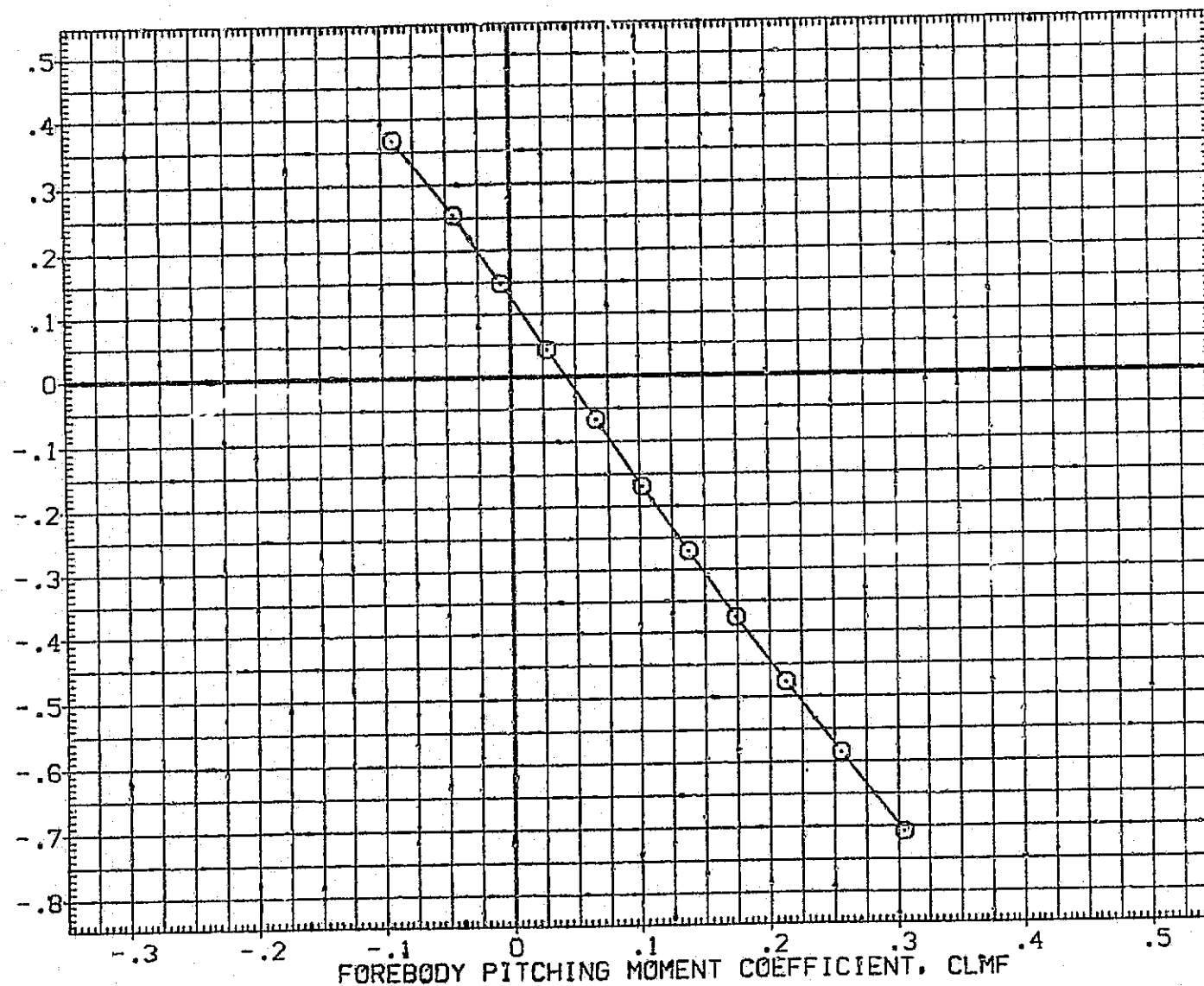


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(A)MACH = .60

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) O MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

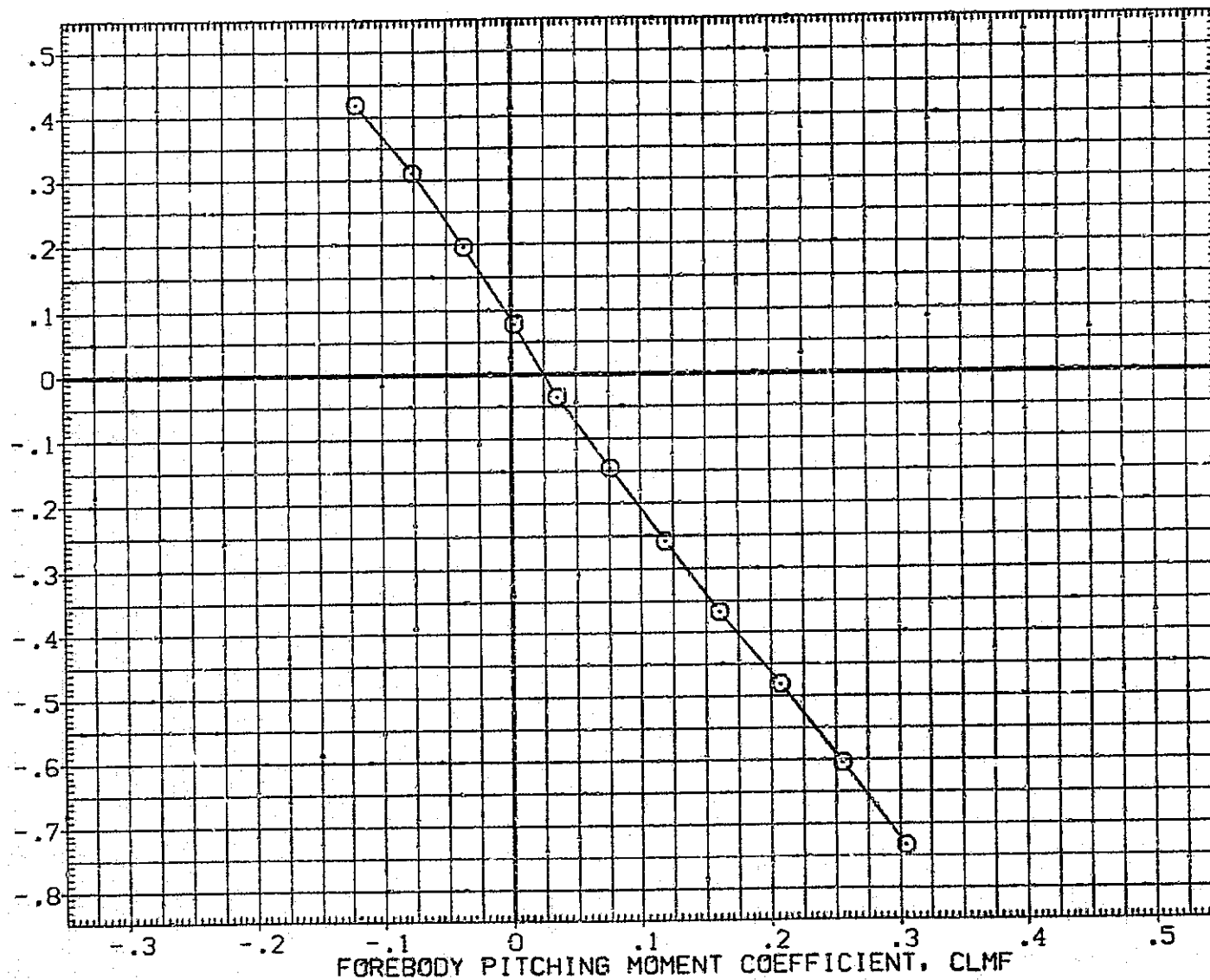


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(B)MACH = .80

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORG STING
 (VIC007) ○ MSFC S94(1A33) 7407S (T1PISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
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 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

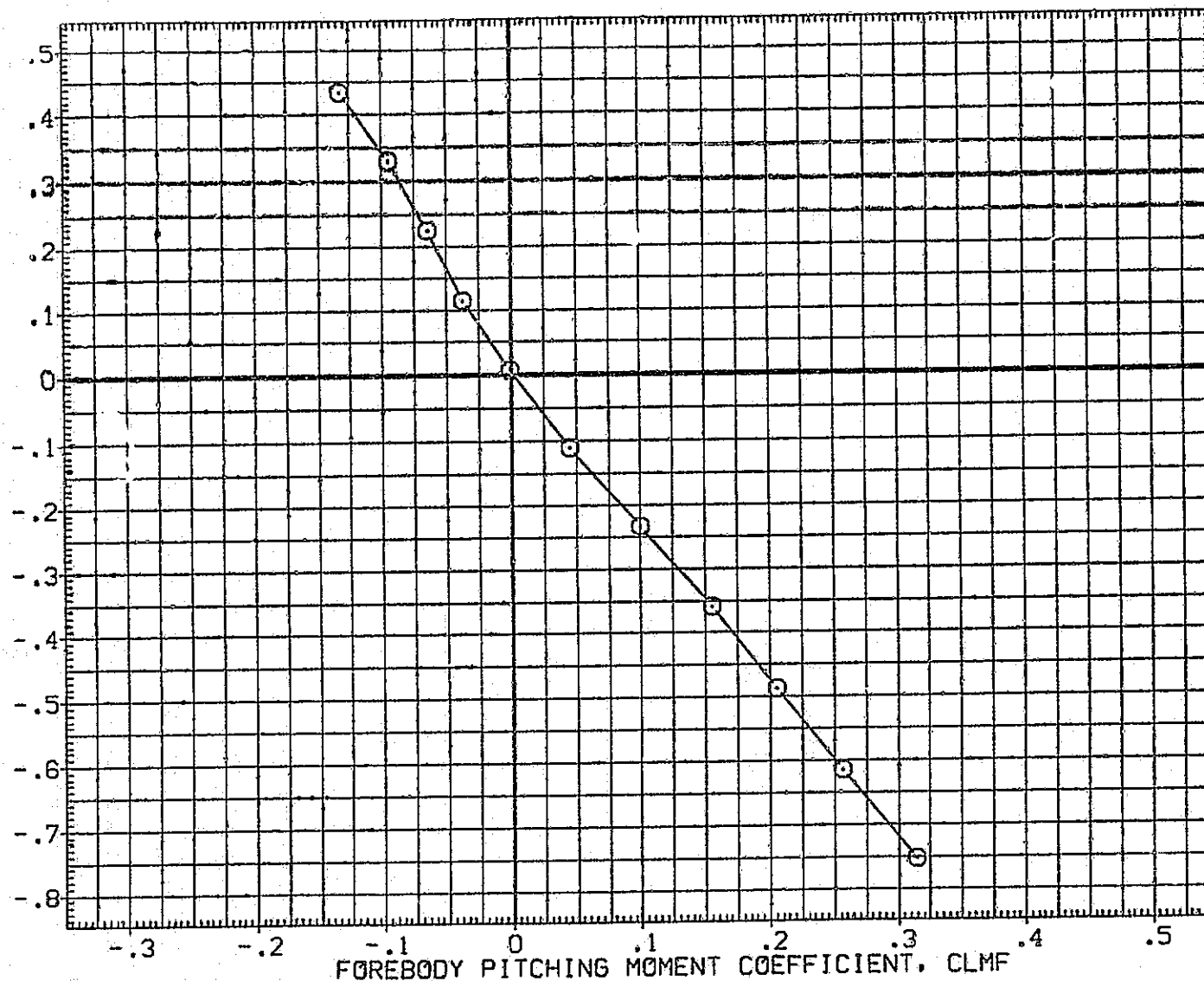


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(C)MACH = .90

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

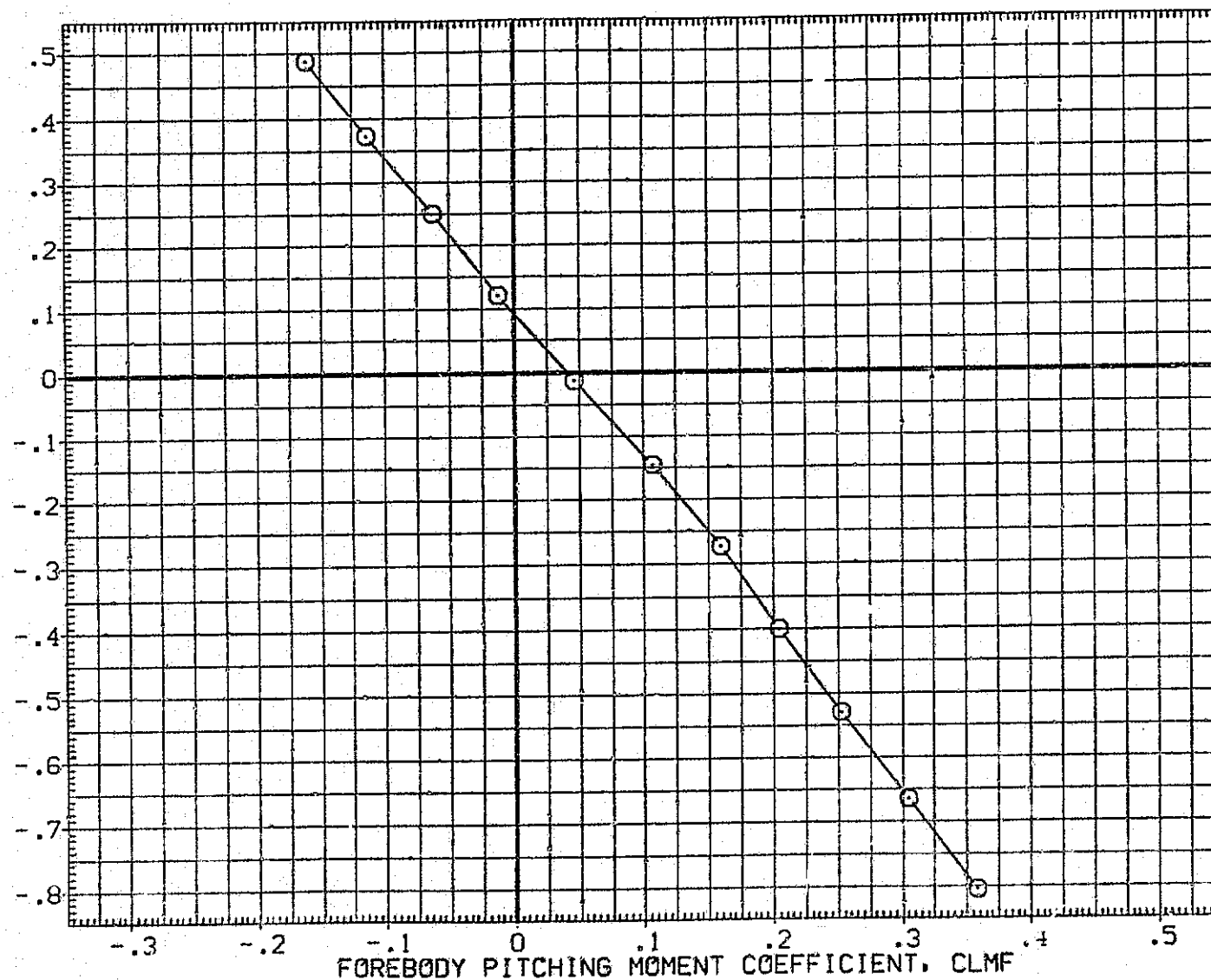


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (D)MACH = 1.10

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STRING
(VIC007) ○ MSFC 594(1A33) 740TS (TIP1S1P201)

REFERENCE INFORMATION
SREF 2690.0000 SQ. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0040

NORMAL FORCE COEFFICIENT, CN

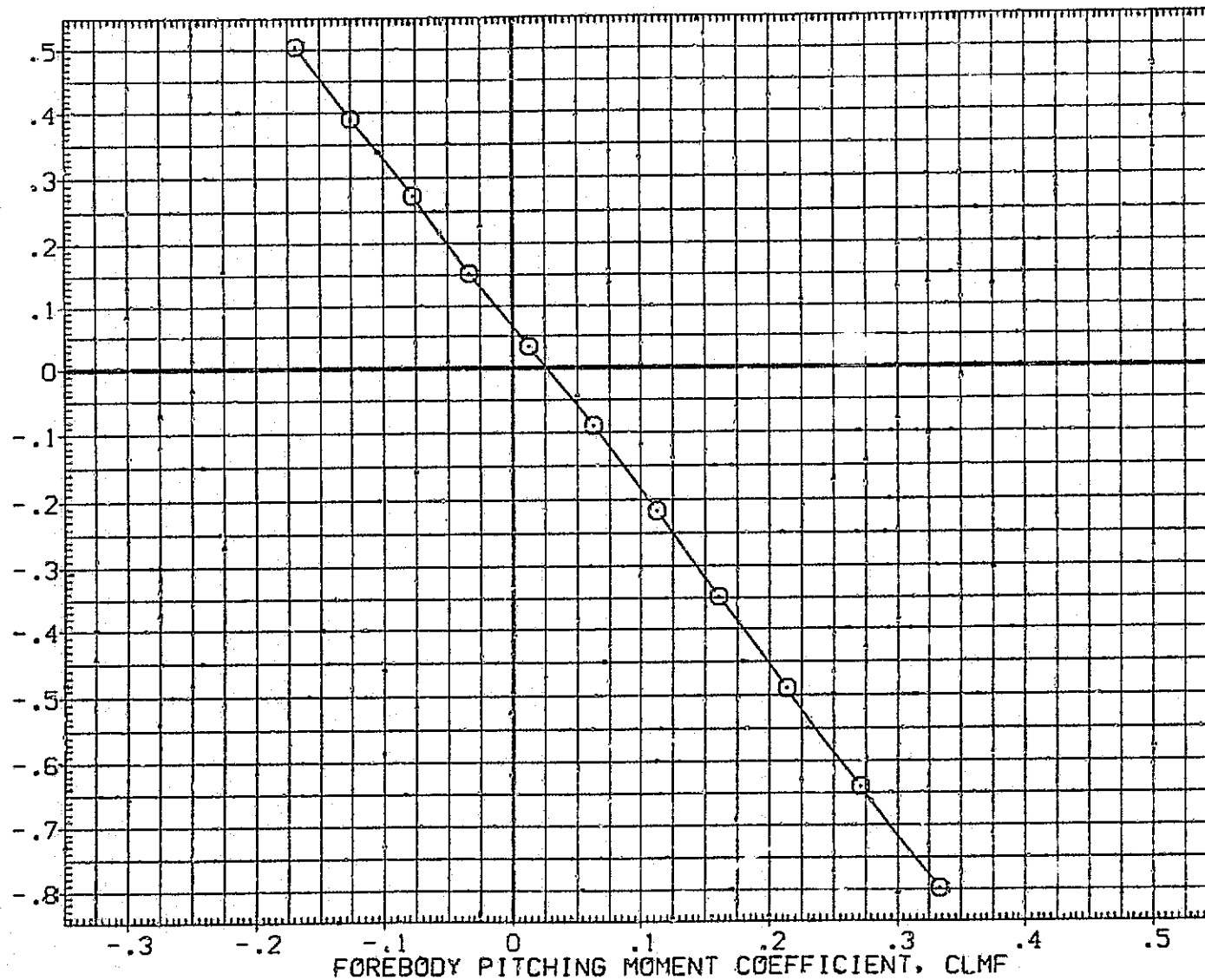


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(E)MACH = 1.25

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) O MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

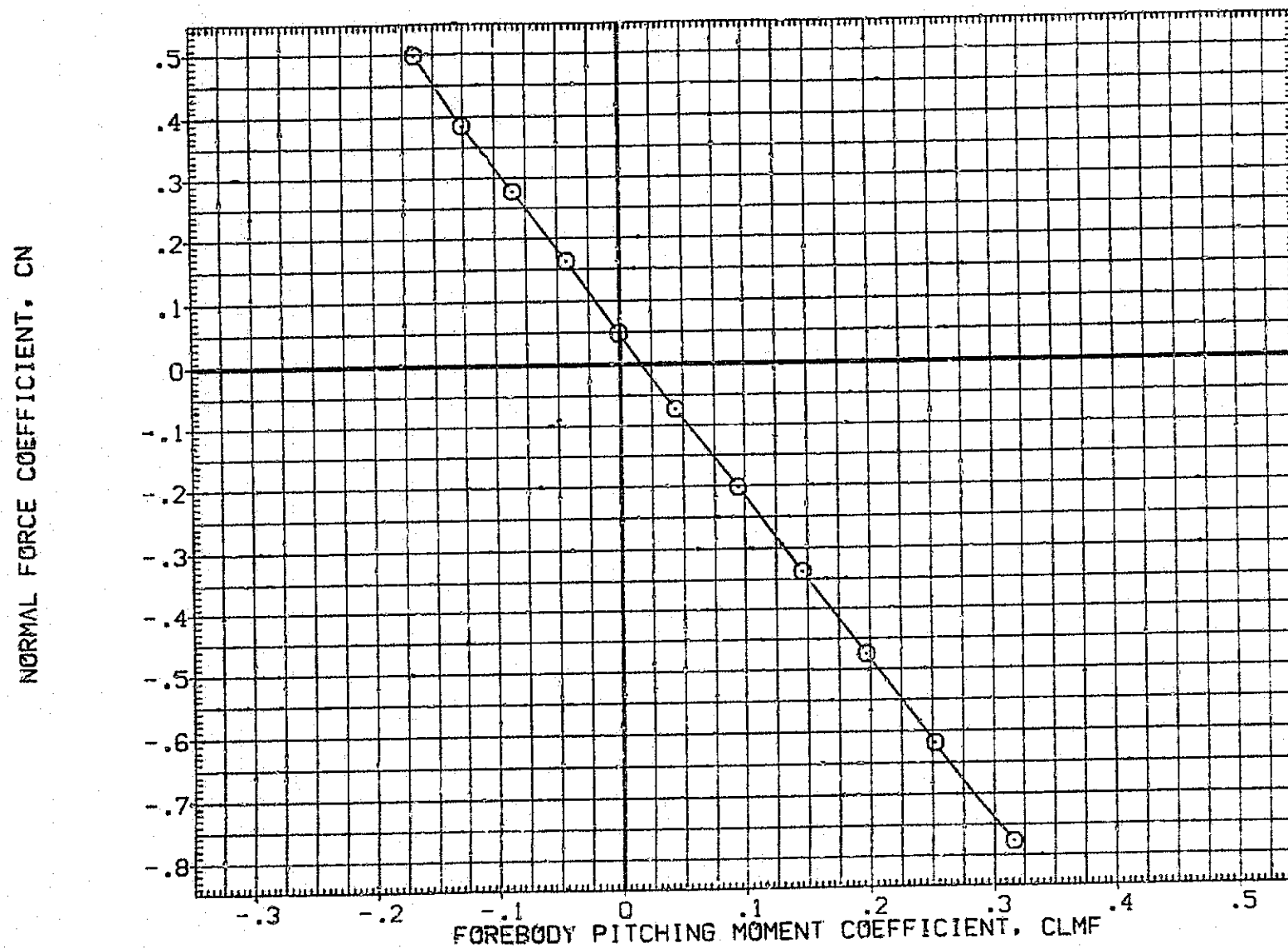


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (F)MACH = 1.46

NORMAL FORCE COEFFICIENT, CN

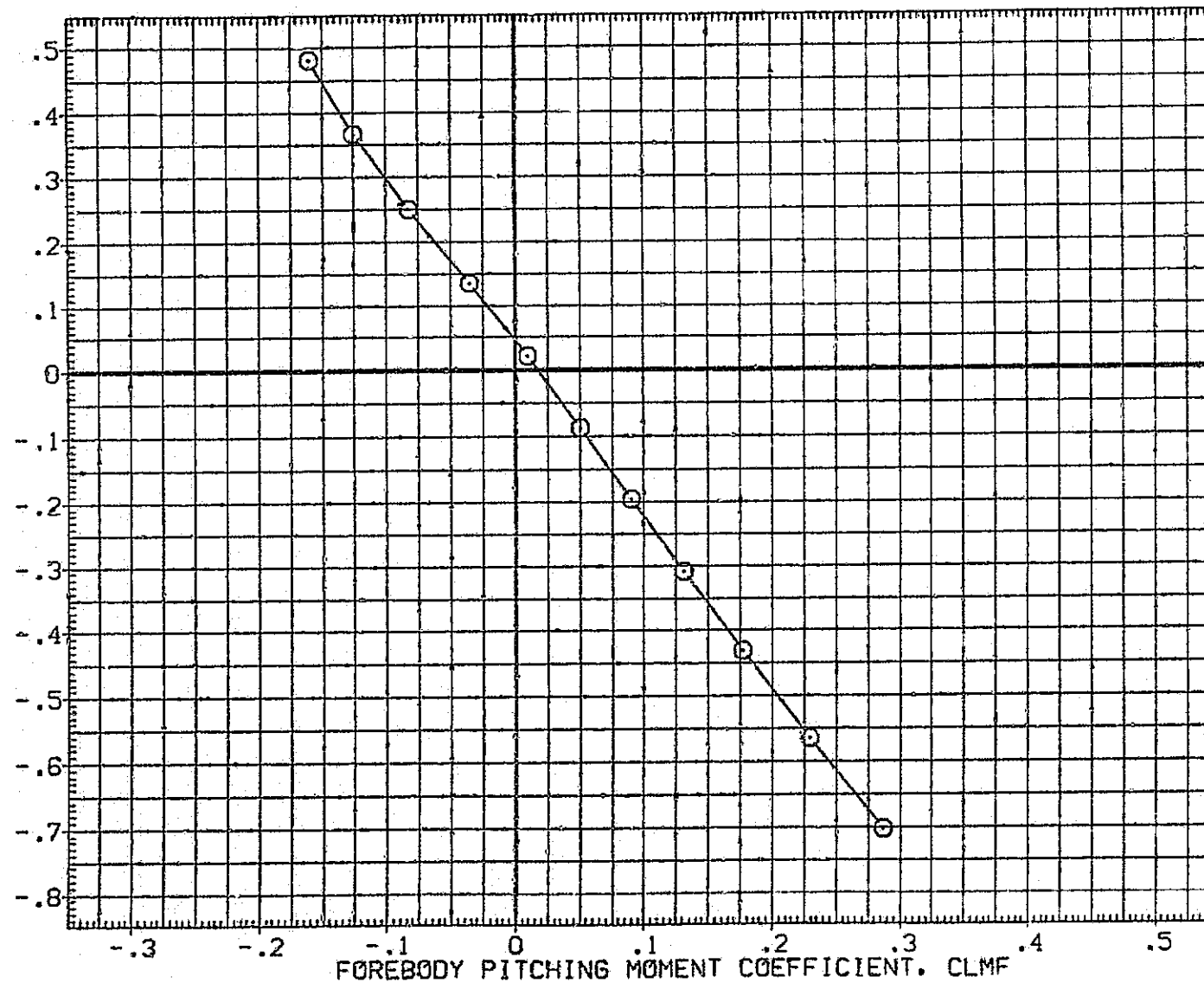


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (G)MACH = 1.96

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORG STING
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
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 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

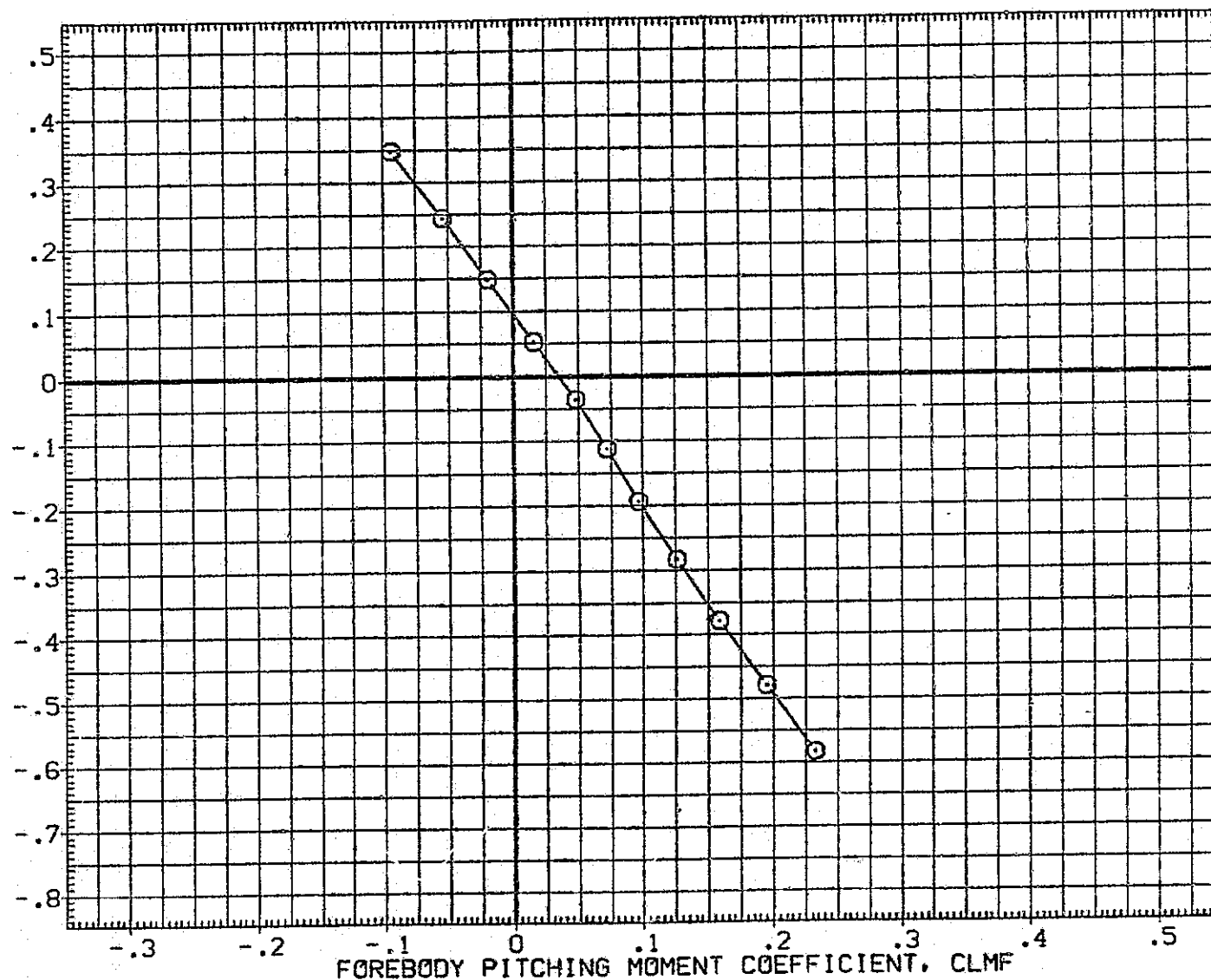


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (H)MACH = 2.99 PAGE 159

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(1A33) 740TS (TIP1SIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1298.0000 IN.
 BREF 1298.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

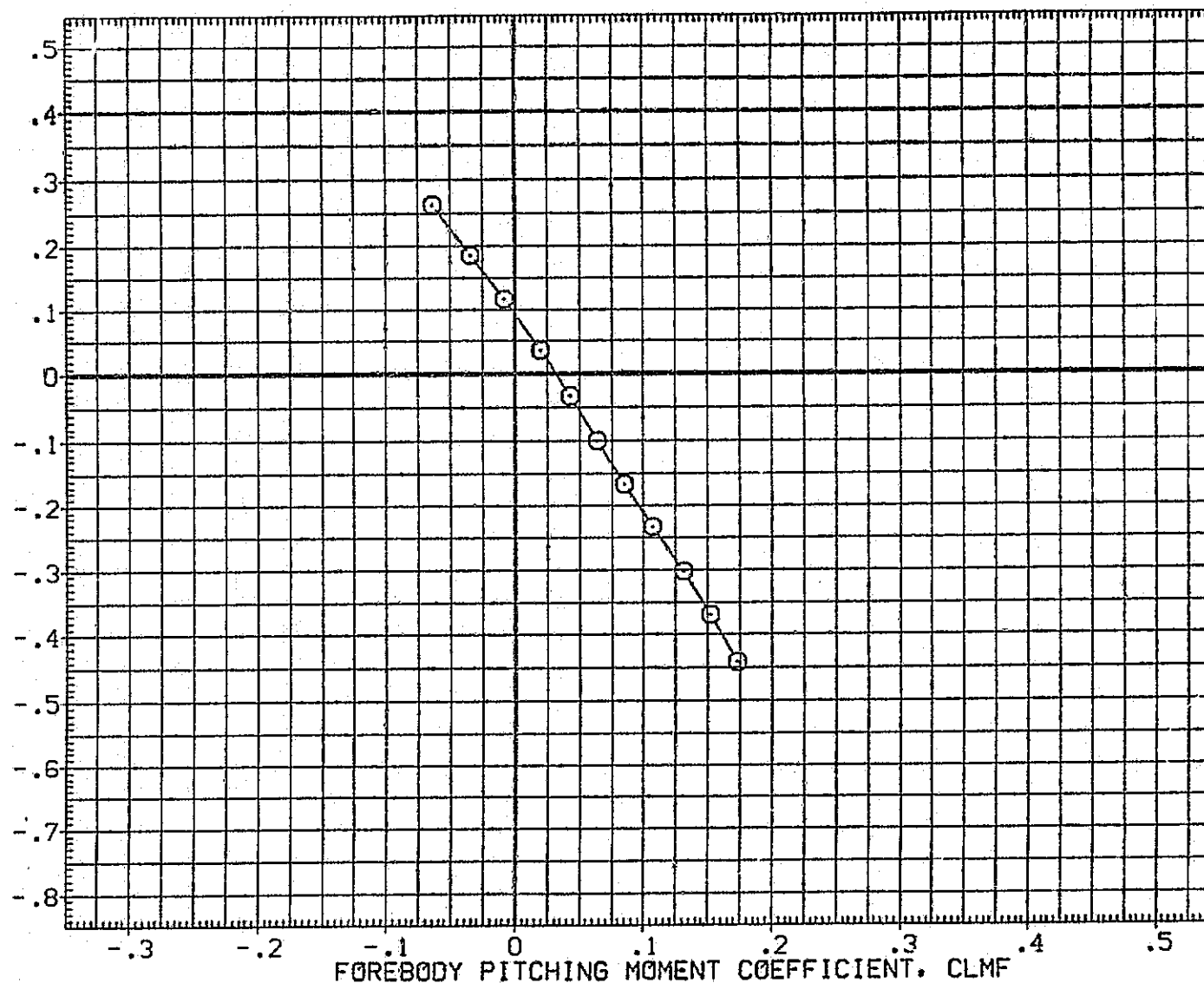


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(I)MACH = 4.96

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (A1C007) ○ MSFC 594(1A33) 740TS (TIP(SIP201))

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

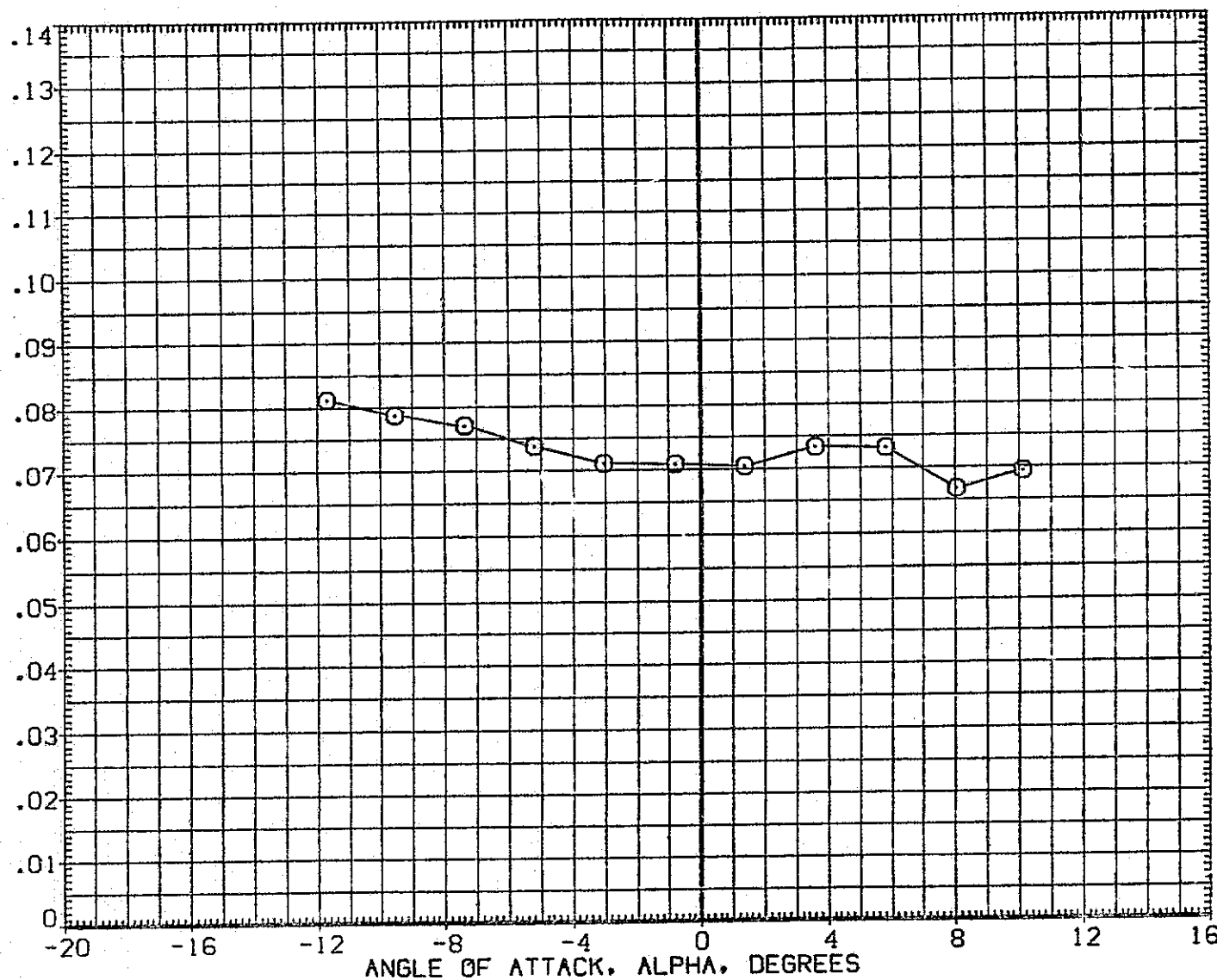


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (A)MACH = .60

DATA SET SYMBOL: CONFIGURATION DESCRIPTION
 (A1C007) ○ MSFC 594 (IA33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

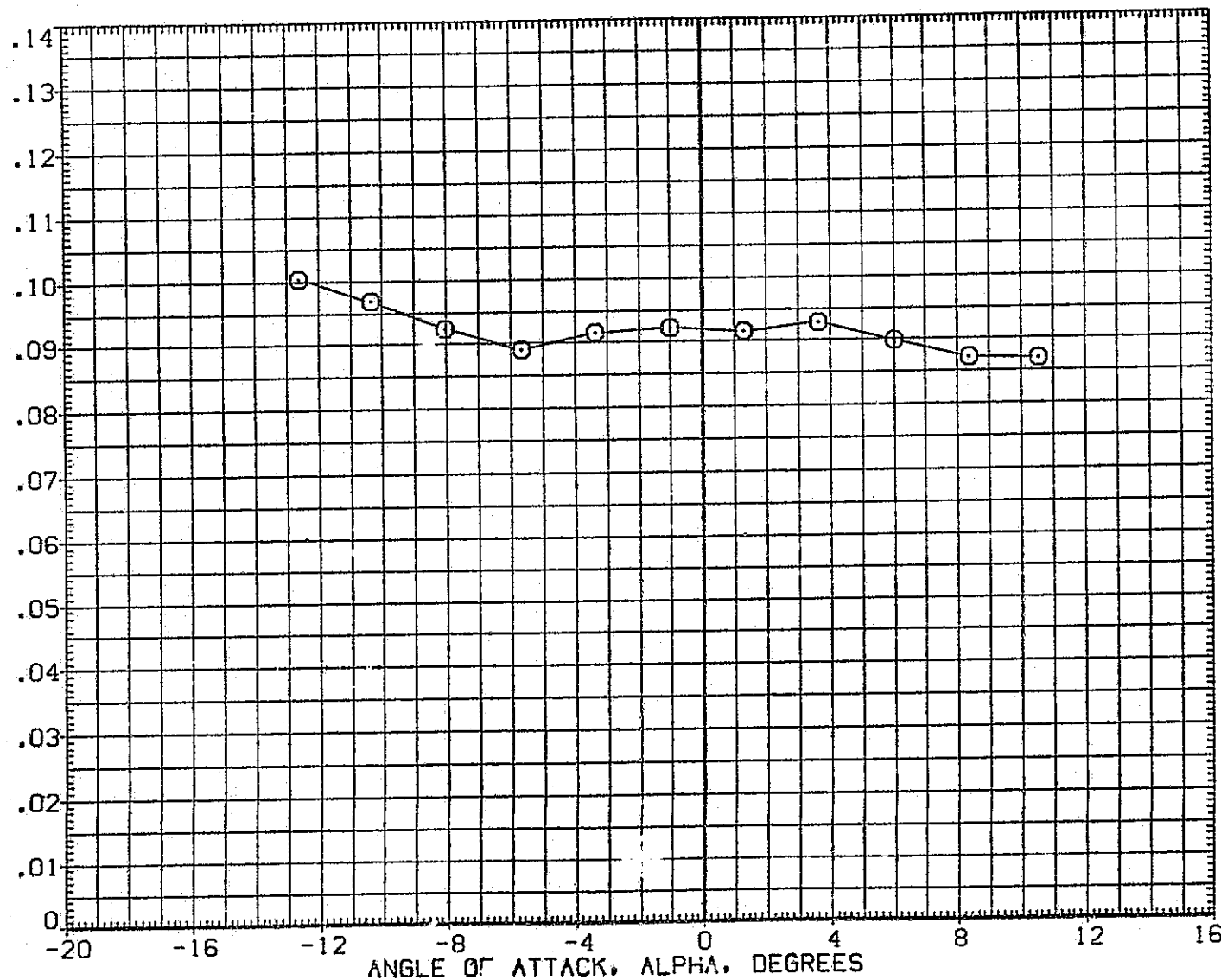


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(B)MACH = .80

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (AIC007) O MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

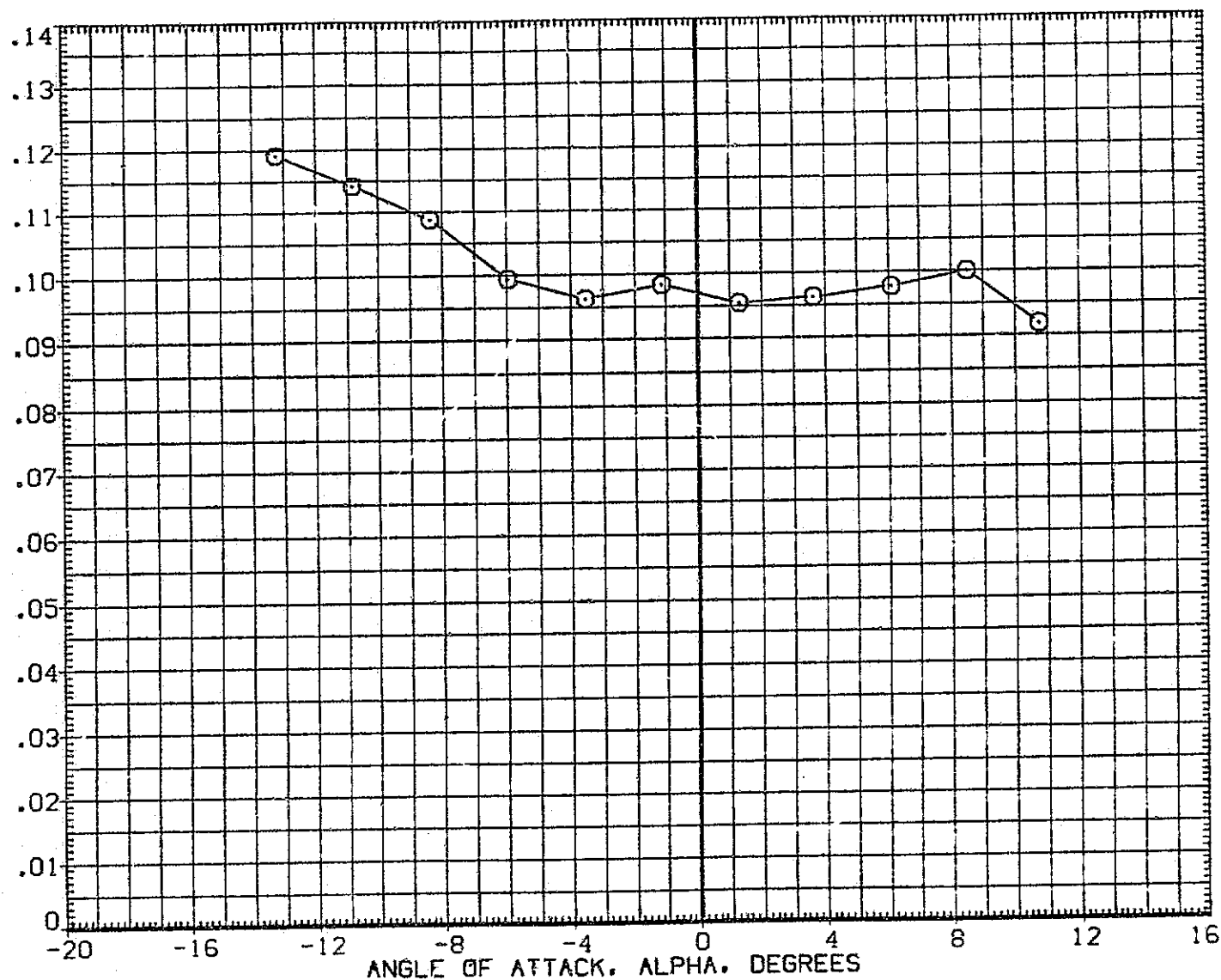


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (C)MACH = .91

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STRING
 (AIC007) ○ MSFC 594(1A33) 740TS (TIP1SIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

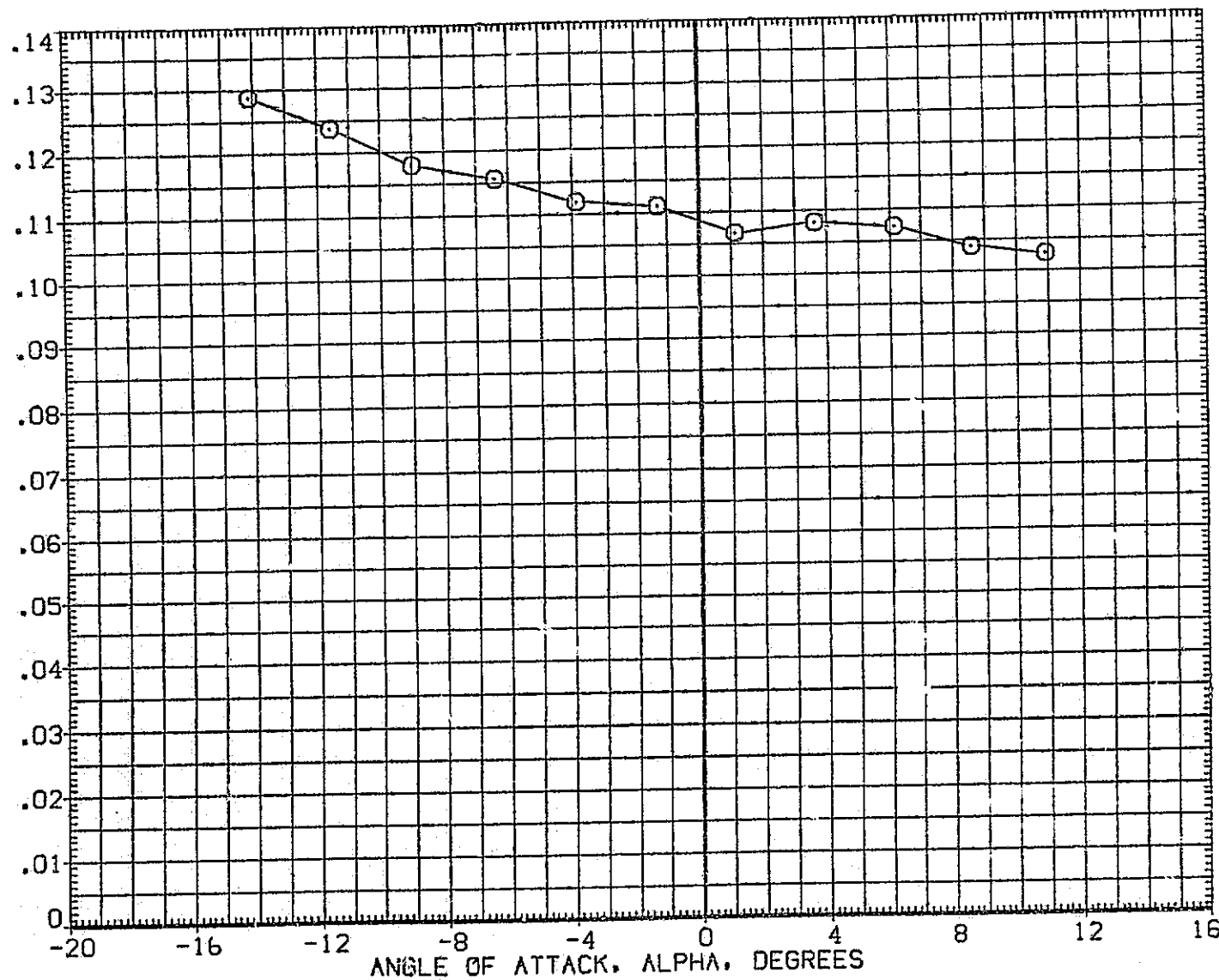


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (CD)MACH = 1.05

DATA SET SYMBOL. CONFIGURATION DESCRIPTION
 (AIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

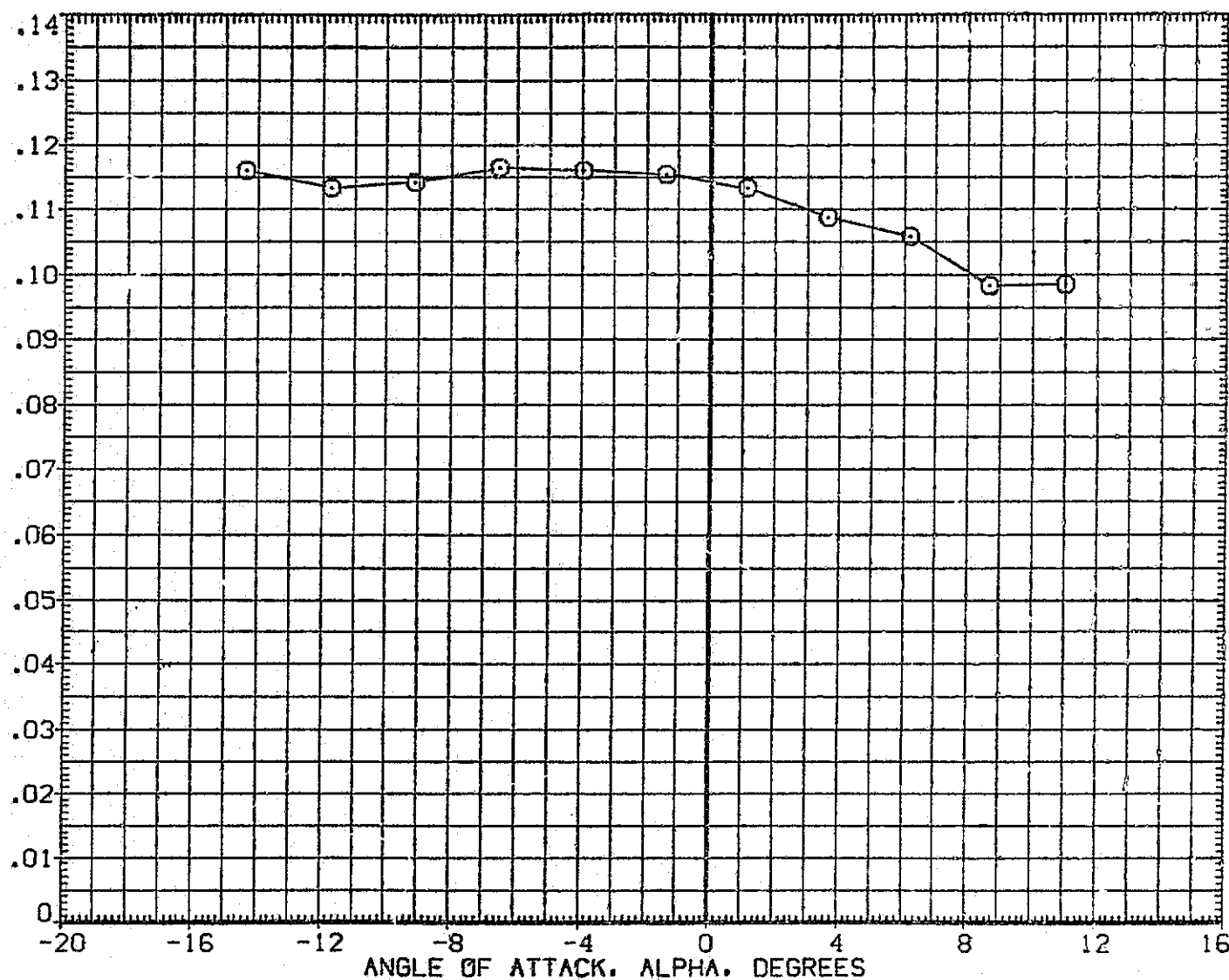


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (E)MACH = 1.10

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (A1C007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

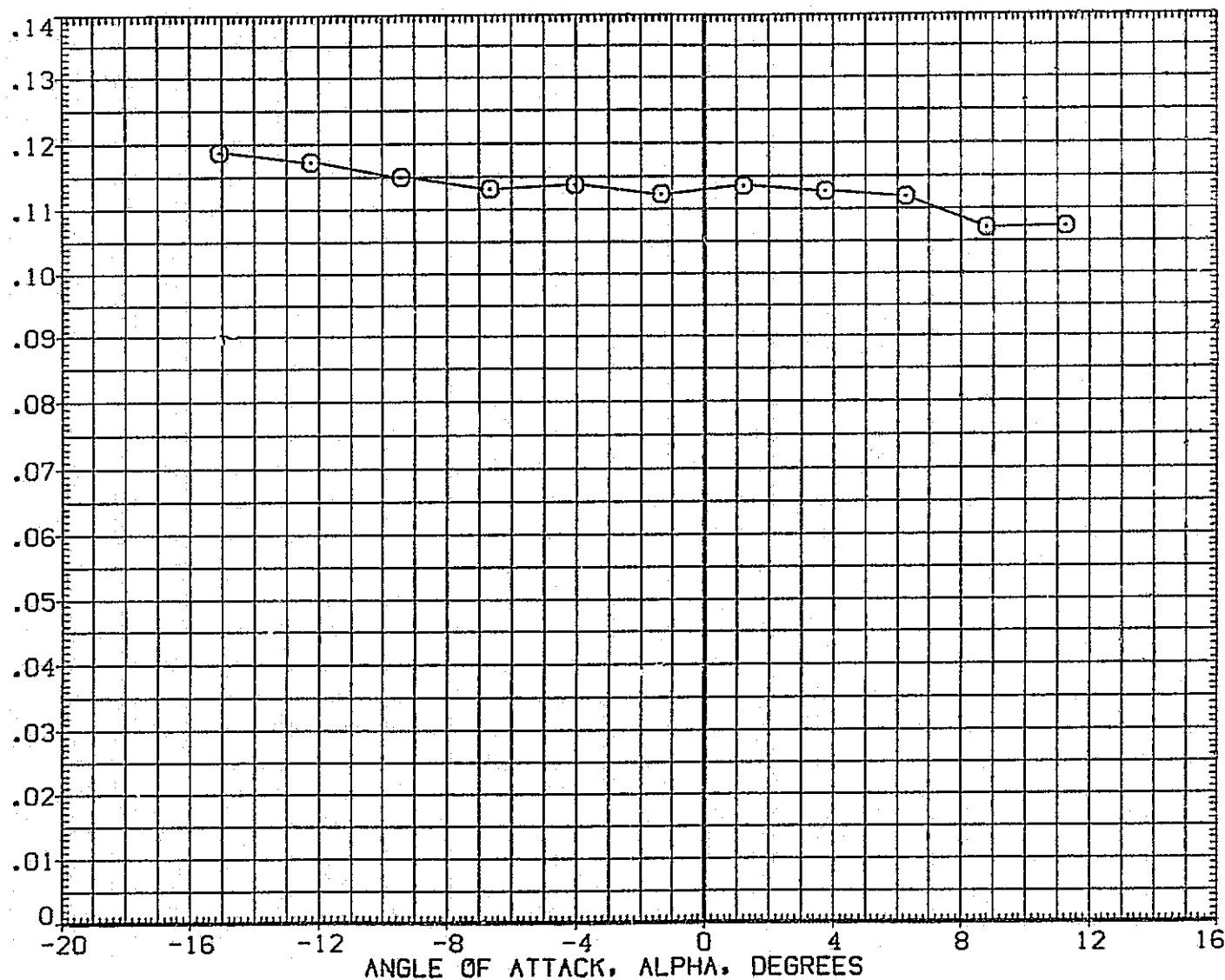


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (F)MACH = 1.25

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (AIC007) O MSFC 594(1A33) 740YS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 SREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

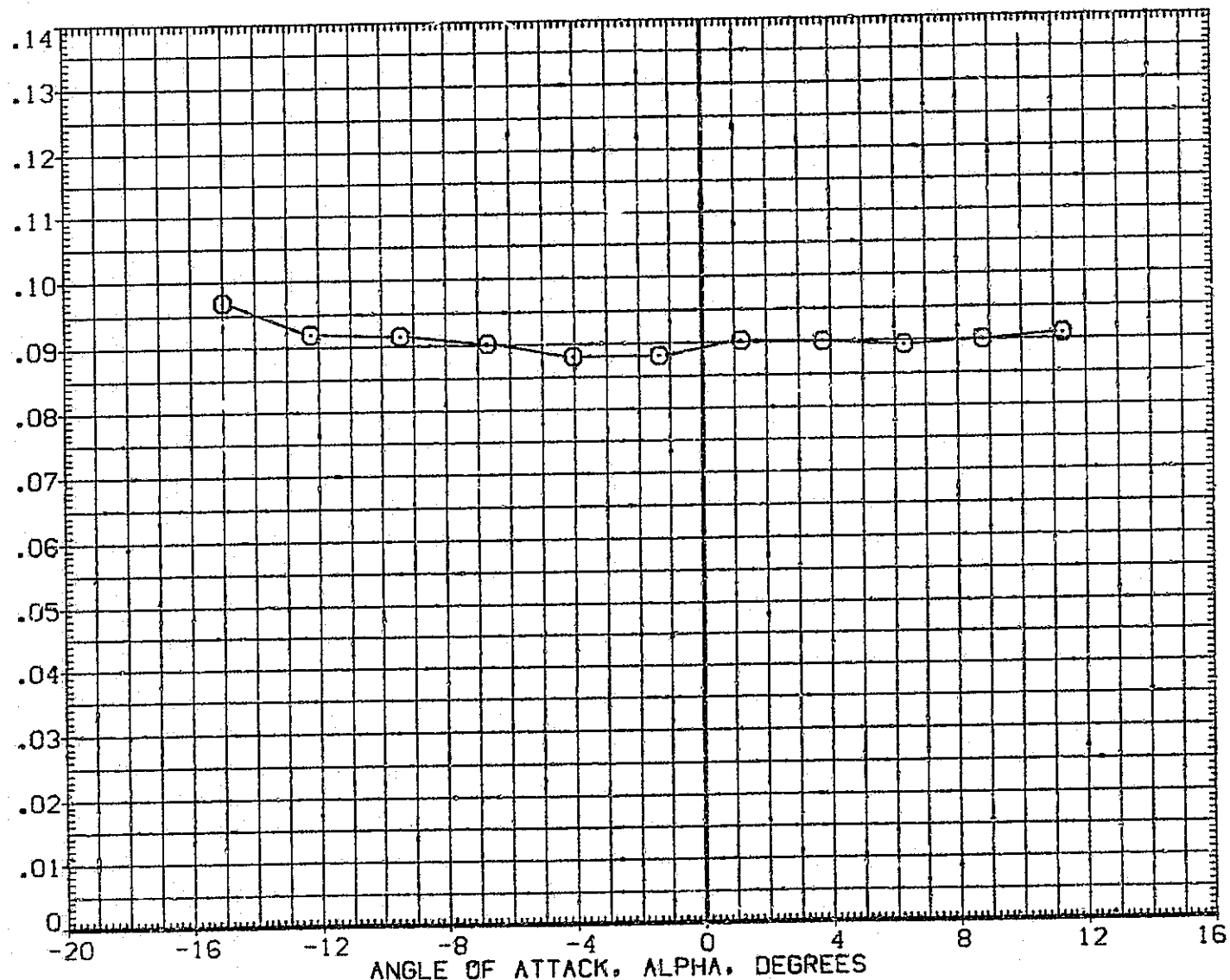


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(G)MACH = 1.46

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (A1C007) ○ MSFC 594(1A33) 740TS (TIP(SIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

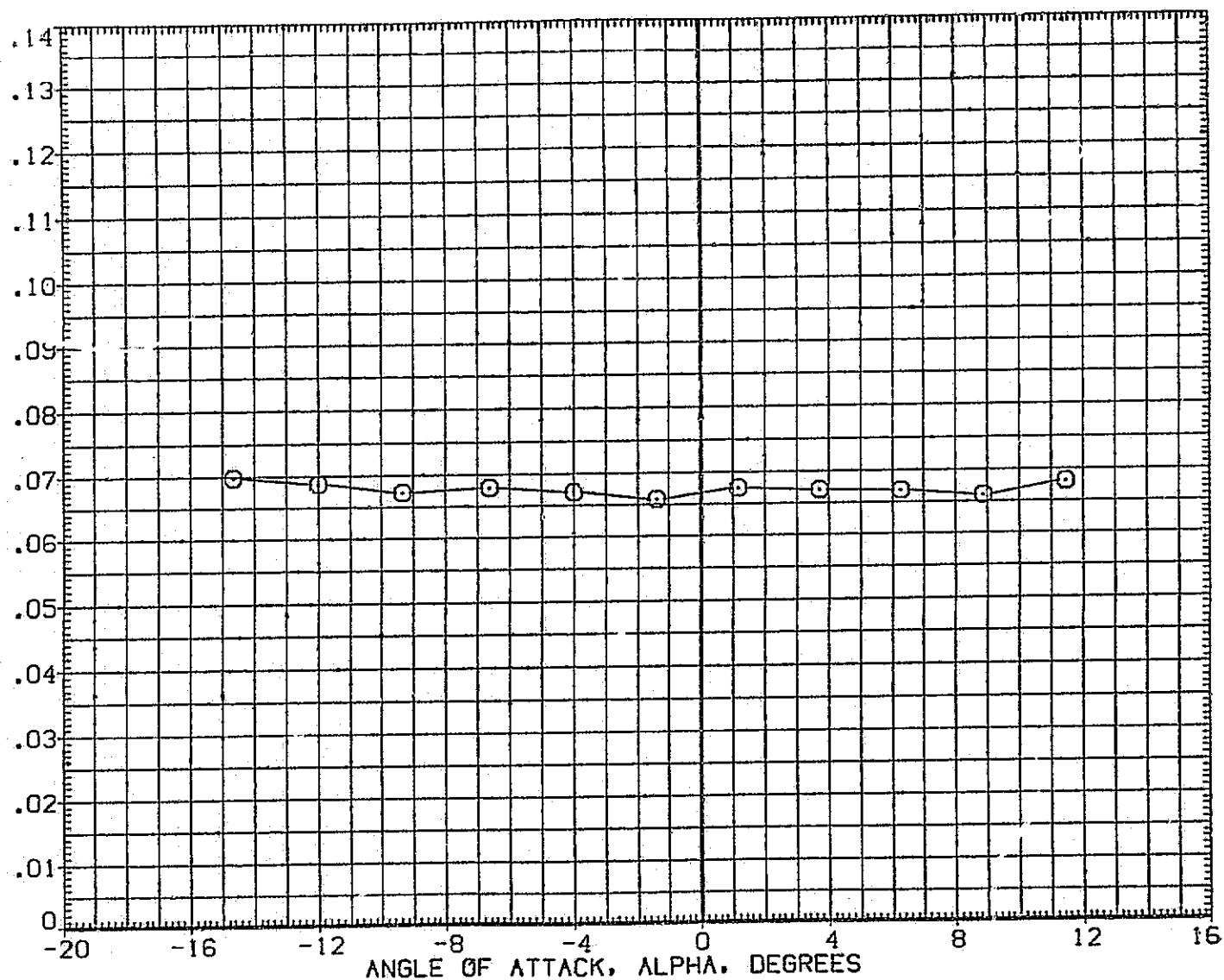


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (H)MACH = 1.97 PAGE 168

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (AIC037) ○ MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

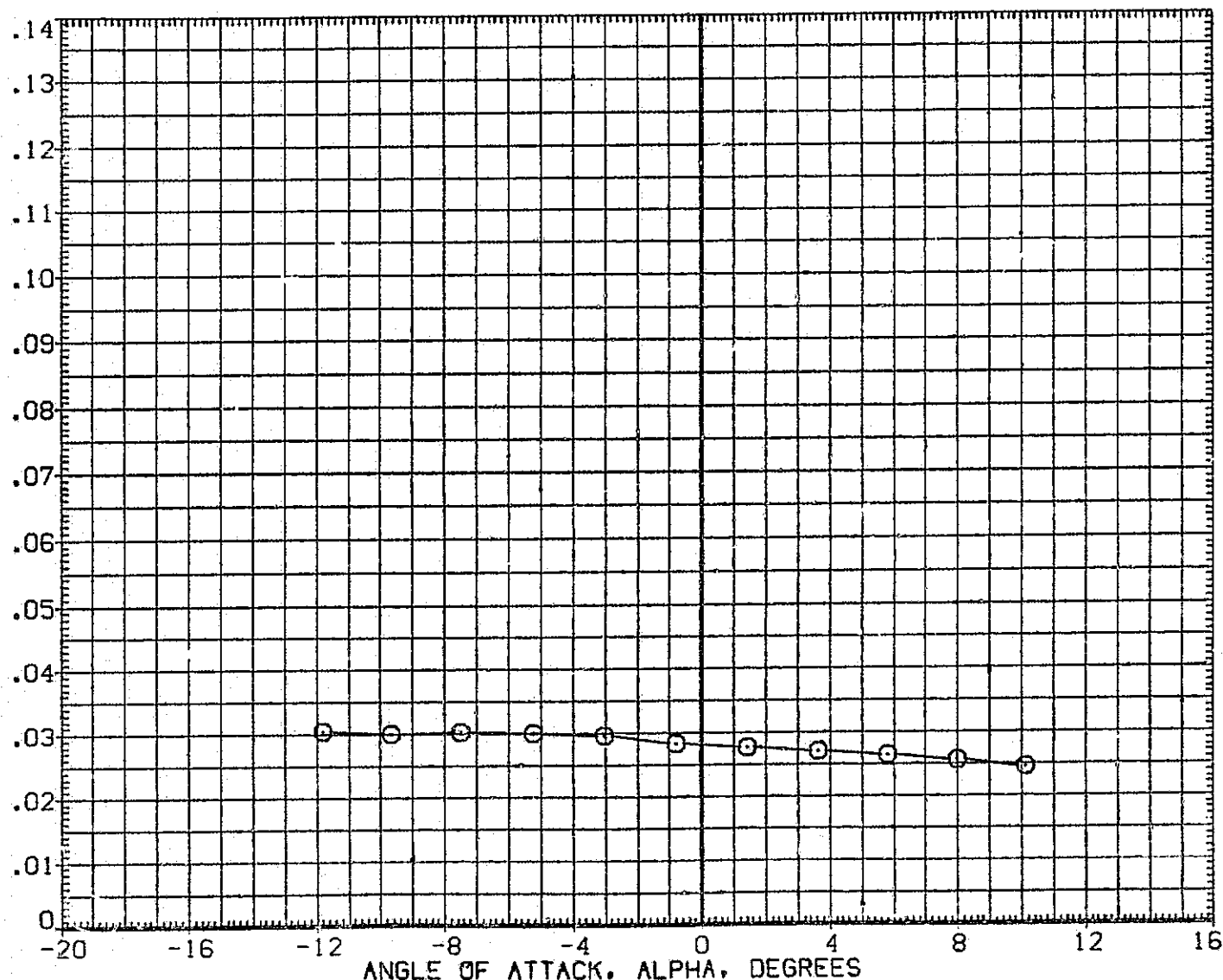


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (1)MACH = 2.99

DATA SET SYMBOL CONFIGURATION DESCRIPTION
(AIC007) ○ MSFC 594(IA33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
SREF 2690.0000 SQ. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0040

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

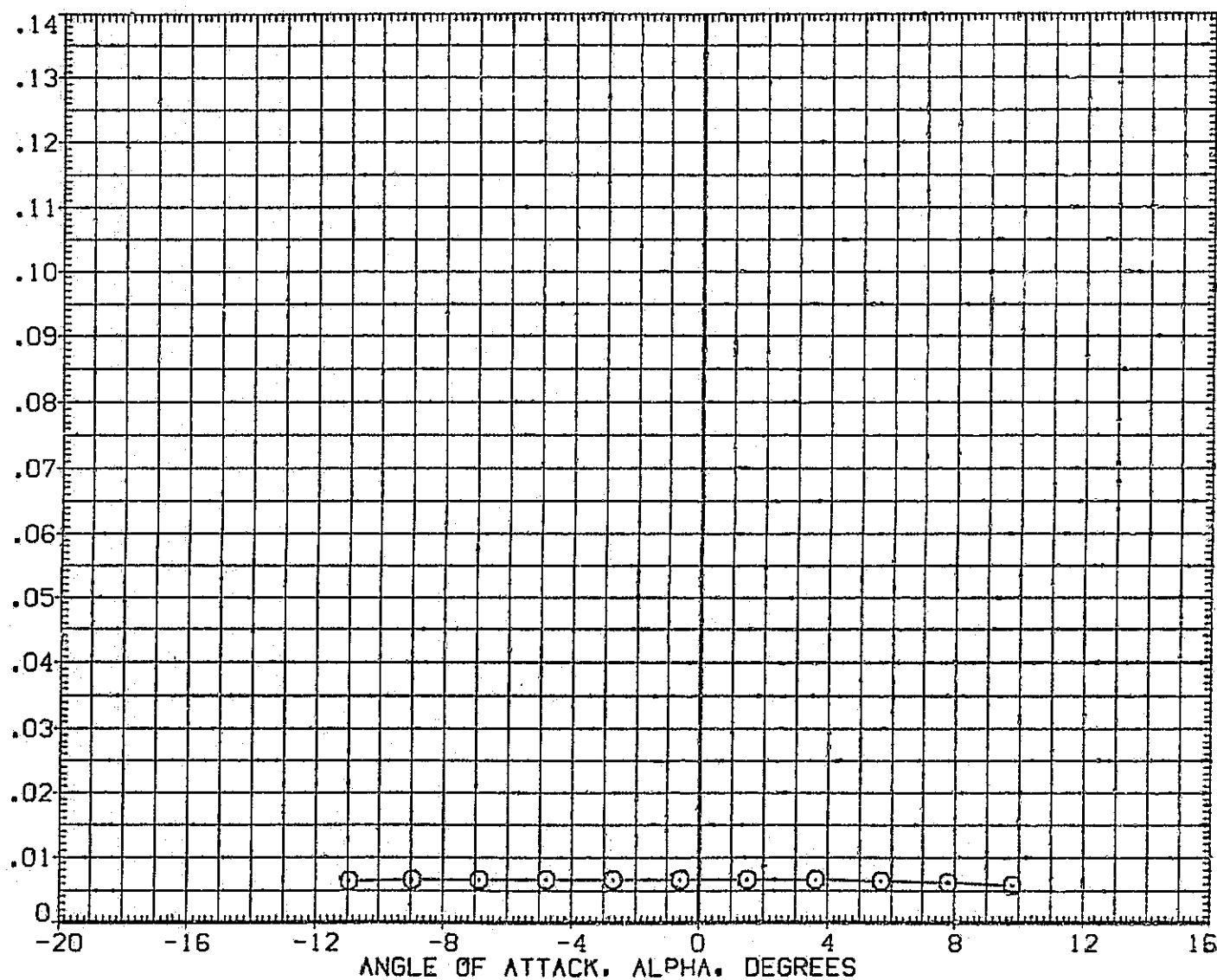


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(J)MACH = 4.96

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DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (AIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE 0040

SRB BASE AXIAL FORCE COEFFICIENT, CABS

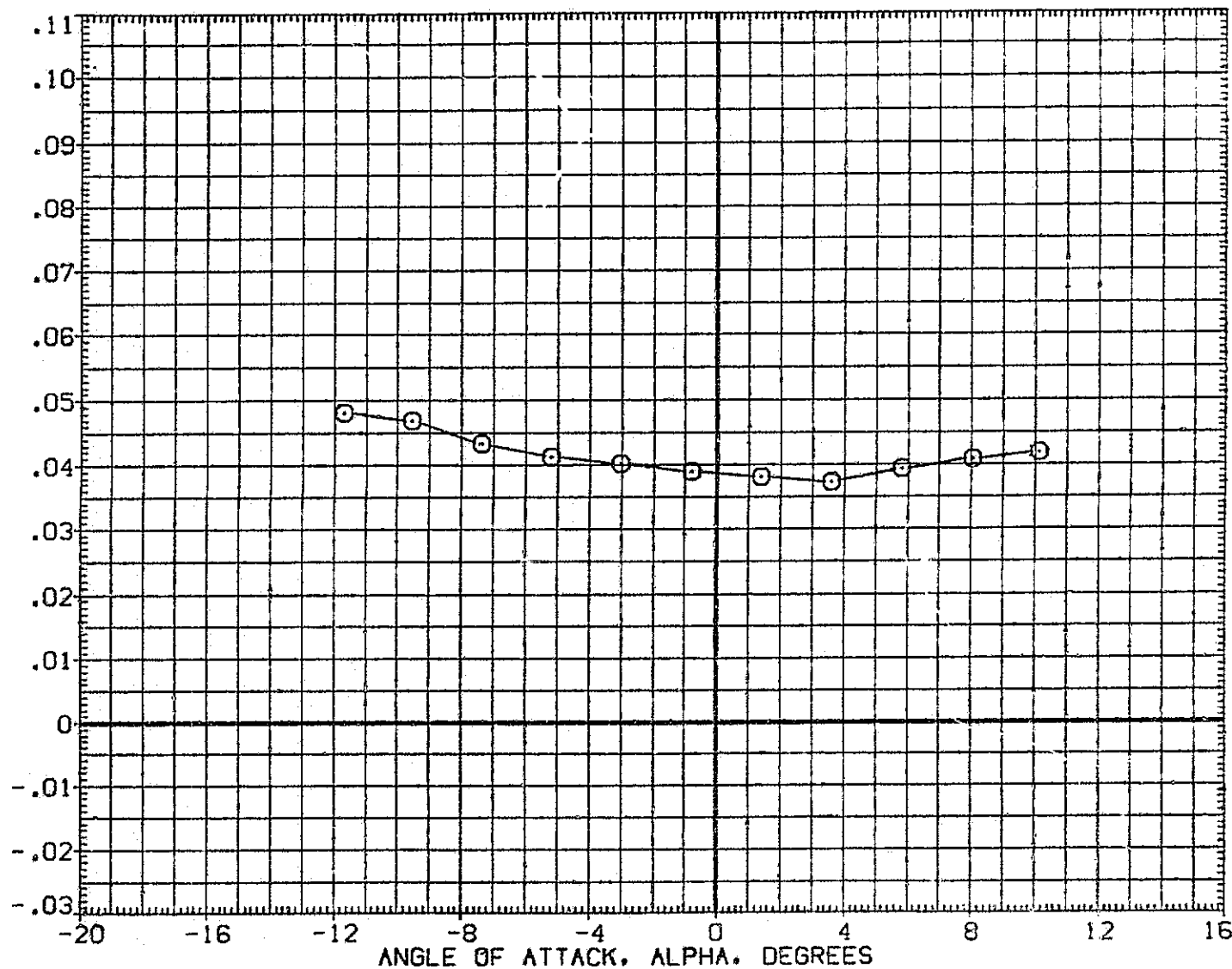


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(A)MACH = .60

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (AIC007) O MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SRB BASE AXIAL FORCE COEFFICIENT, CABS

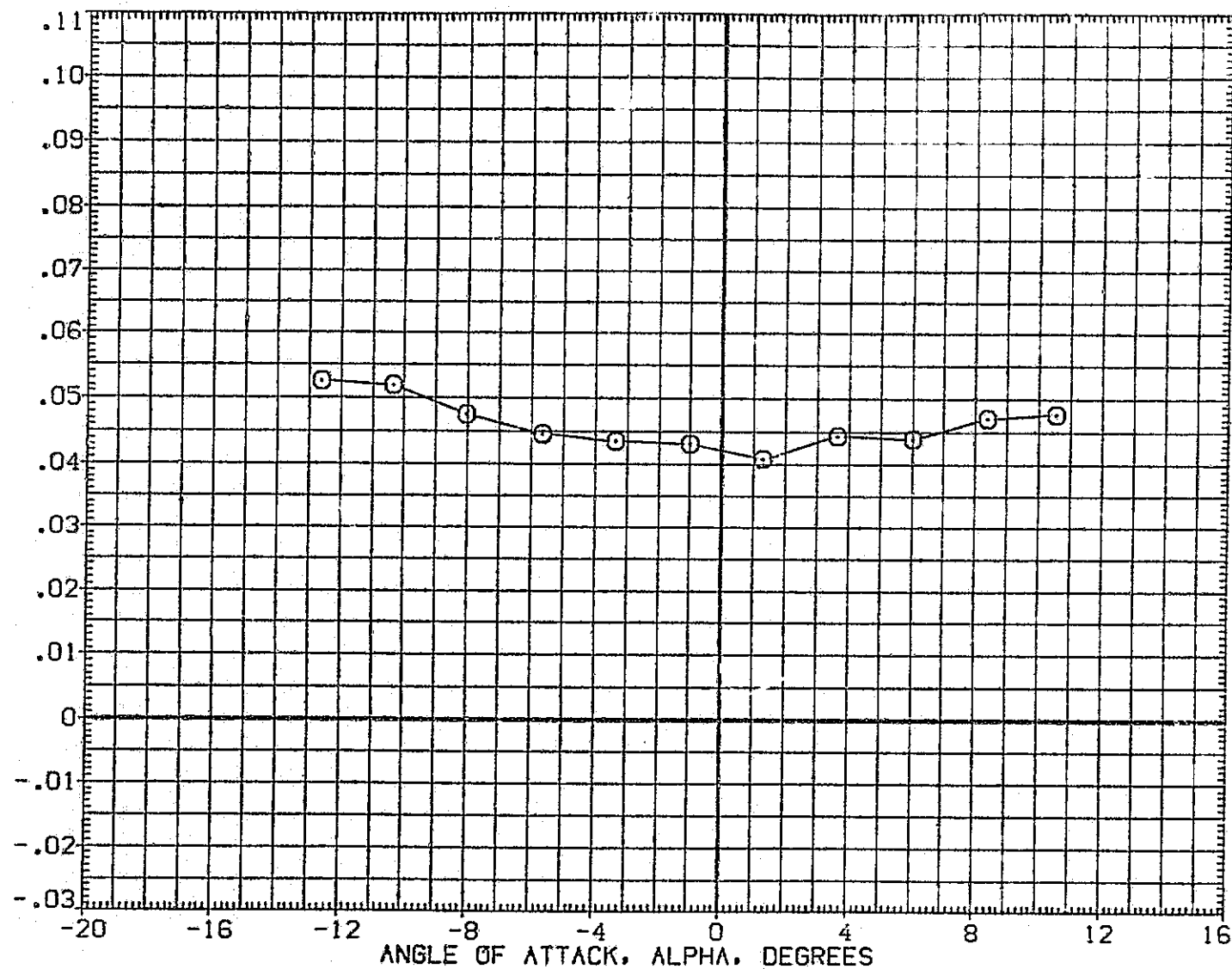


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(B)MACH = .80

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (AIC007) O MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SRB BASE AXIAL FORCE COEFFICIENT, CABS

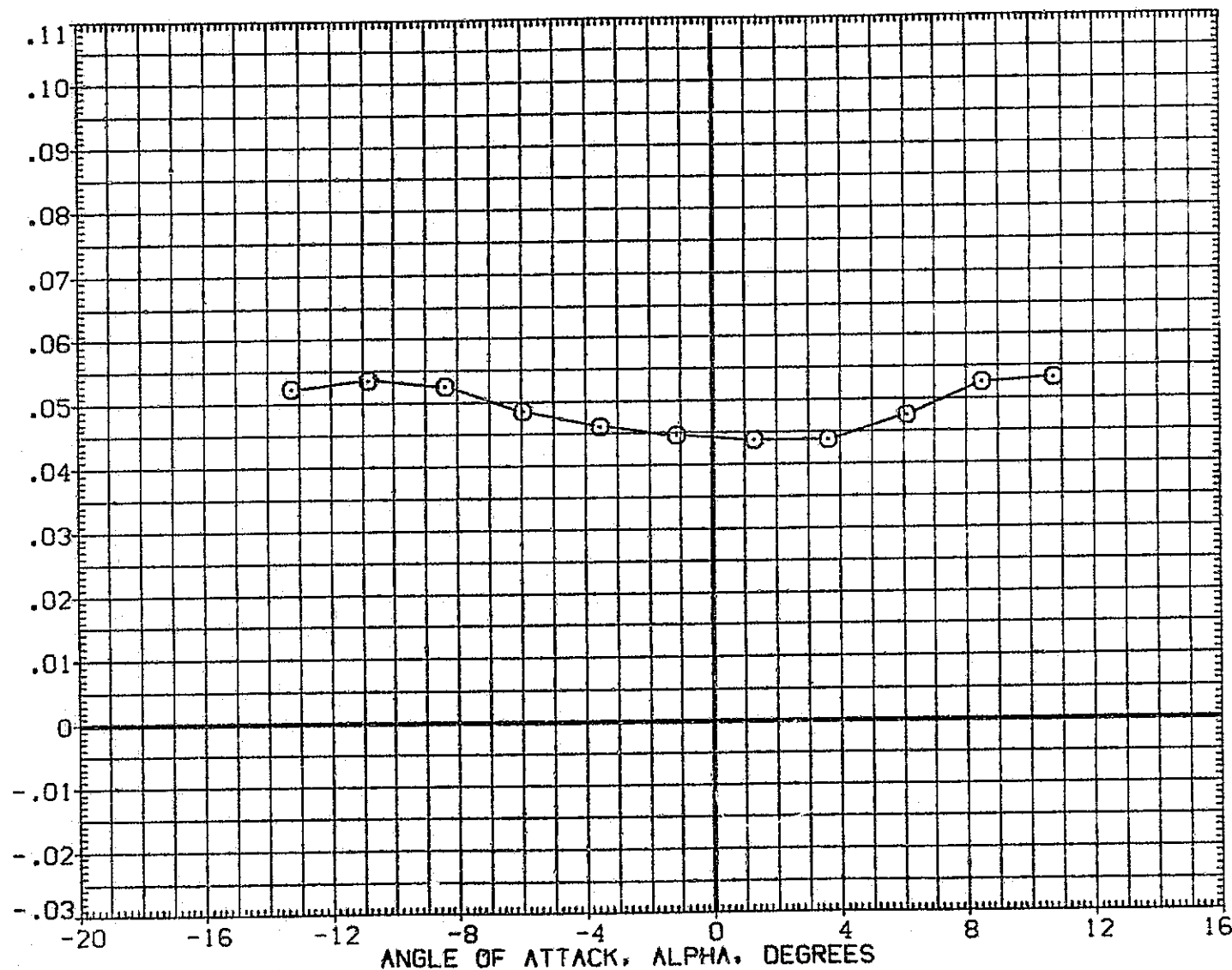


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (C)MACH = .91

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (AIC007) ○ MSFC 594(1A33) 740TS (T1P1S1P201) DRB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SRB BASE AXIAL FORCE COEFFICIENT, CABS

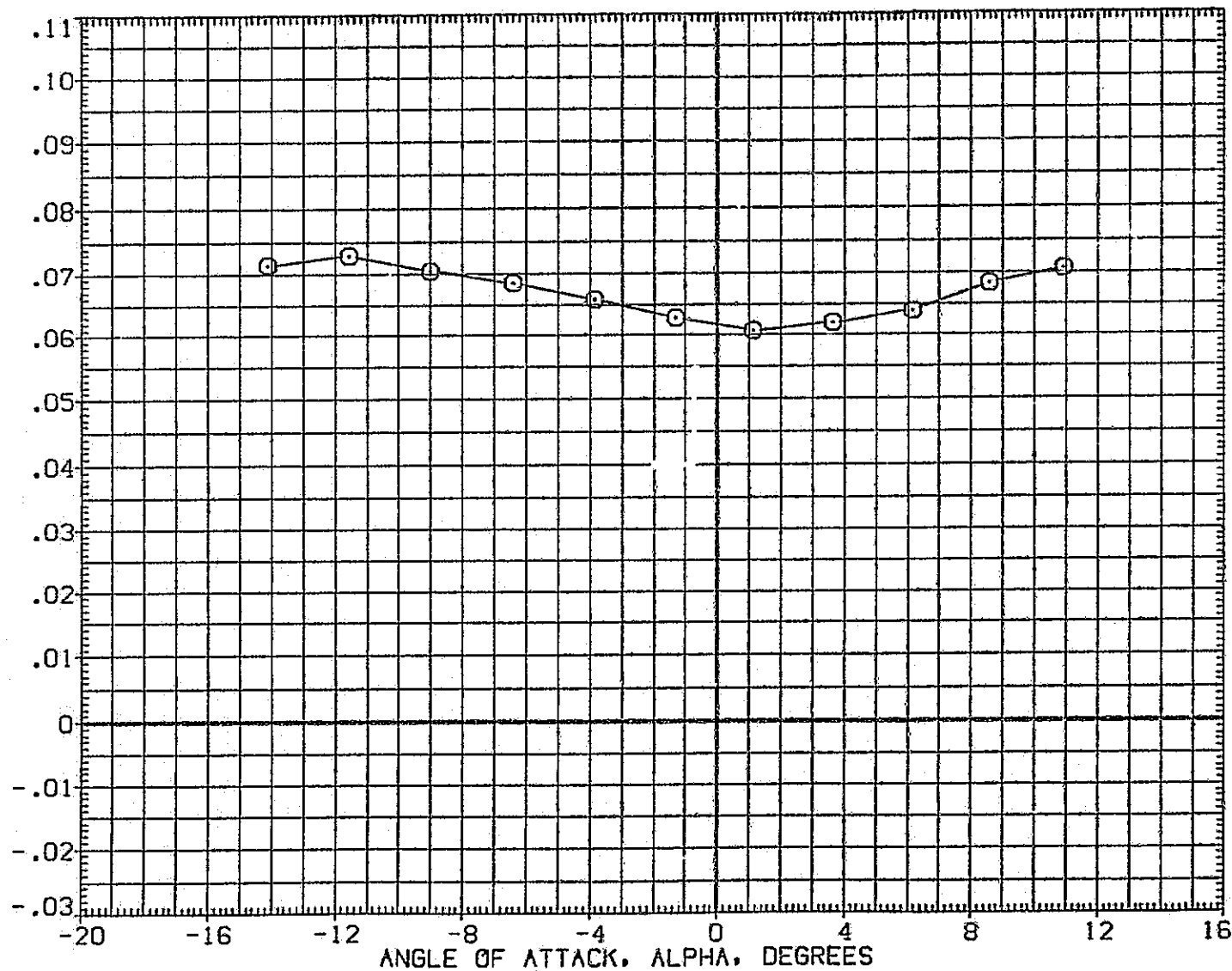


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(D)MACH = 1.05

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (AIC007) ○ MSFC 594(1A33) 740TS (T1PISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SRB BASE AXIAL FORCE COEFFICIENT, CABS

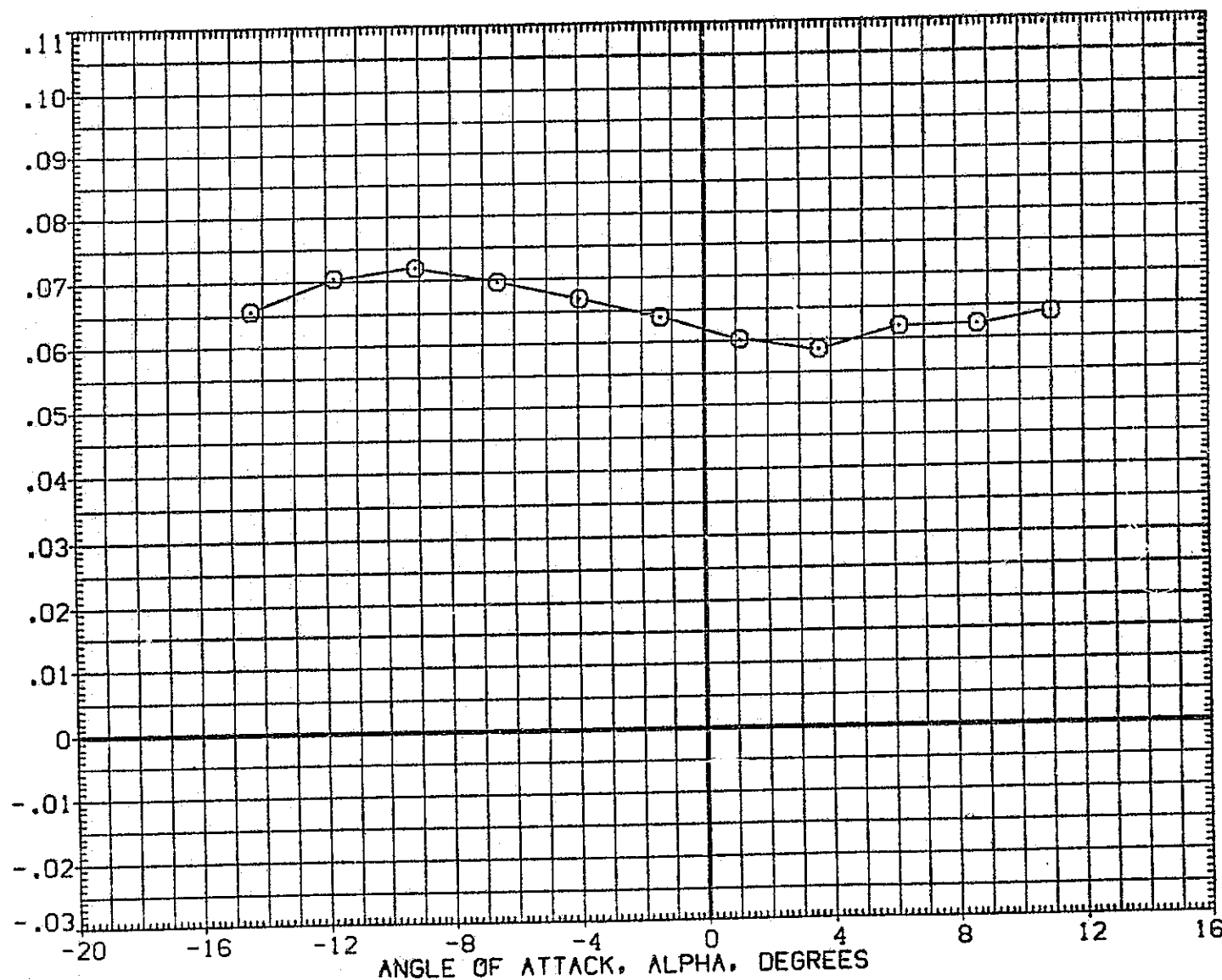


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (E)MACH = 1.10

DATA SET SYMBOL CONFIGURATION DESCRIPTION
(A1C007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
SREF 2690.0000 SQ. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0040

SRB BASE AXIAL FORCE COEFFICIENT, CABS

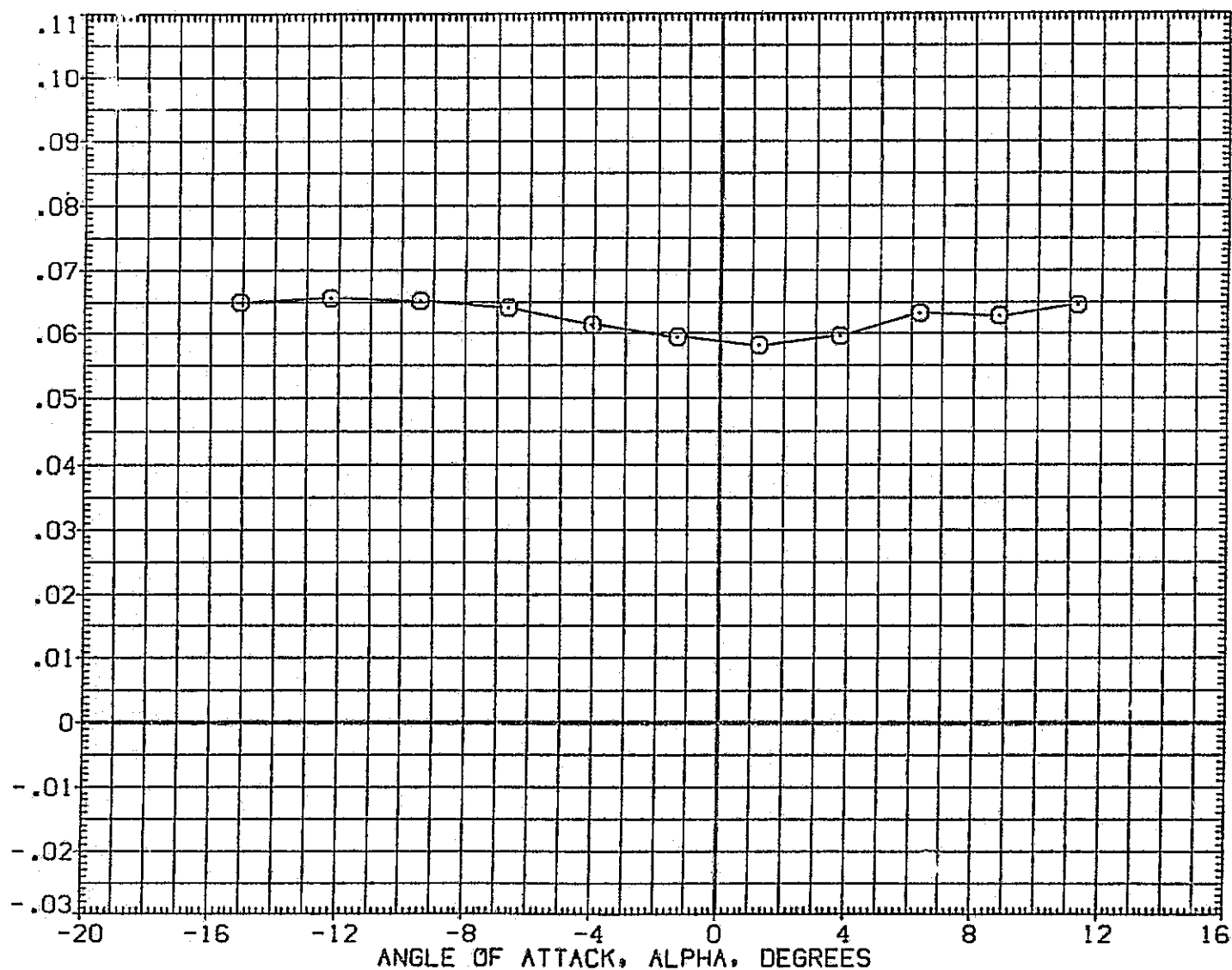


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(F)MACH = 1.25

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (AIC007) ○ MSFC 594(1A33) 740TS (TIP15IP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SRB BASE AXIAL FORCE COEFFICIENT, CABS

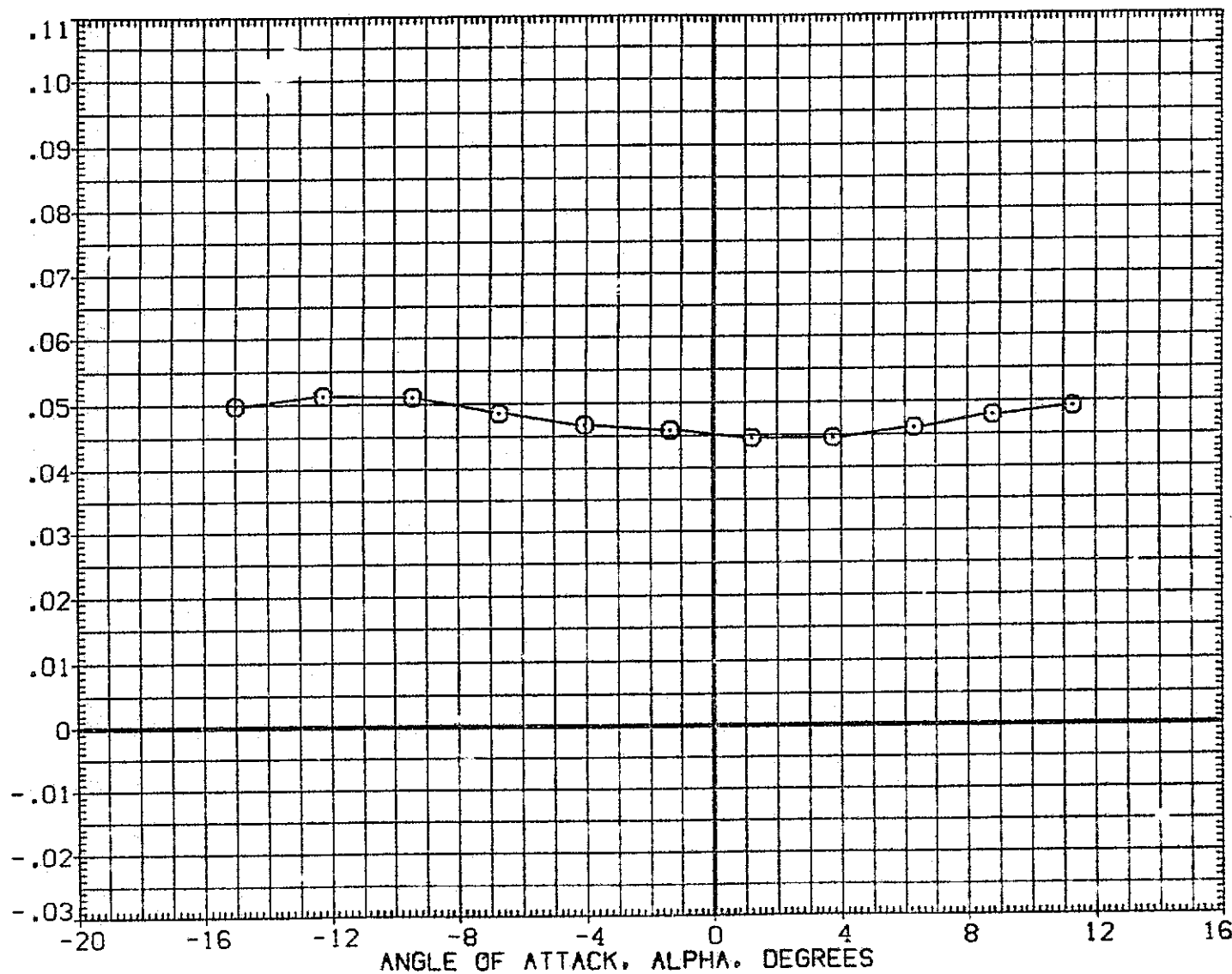


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(G)MACH = 1.46

SRB BASE AXIAL FORCE COEFFICIENT, CABS

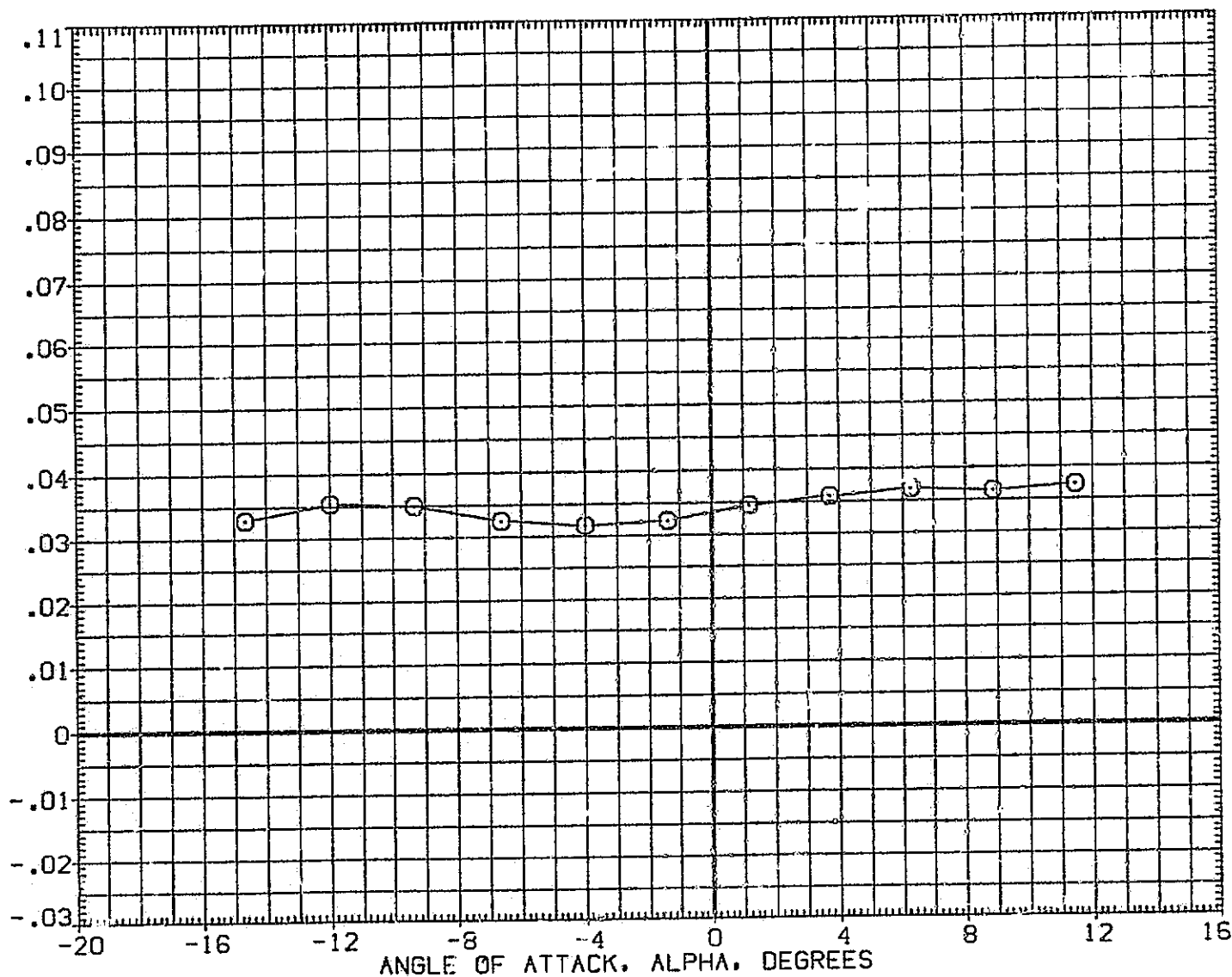


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (H)MACH = 1.97

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (AIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SRB BASE AXIAL FORCE COEFFICIENT, CABS

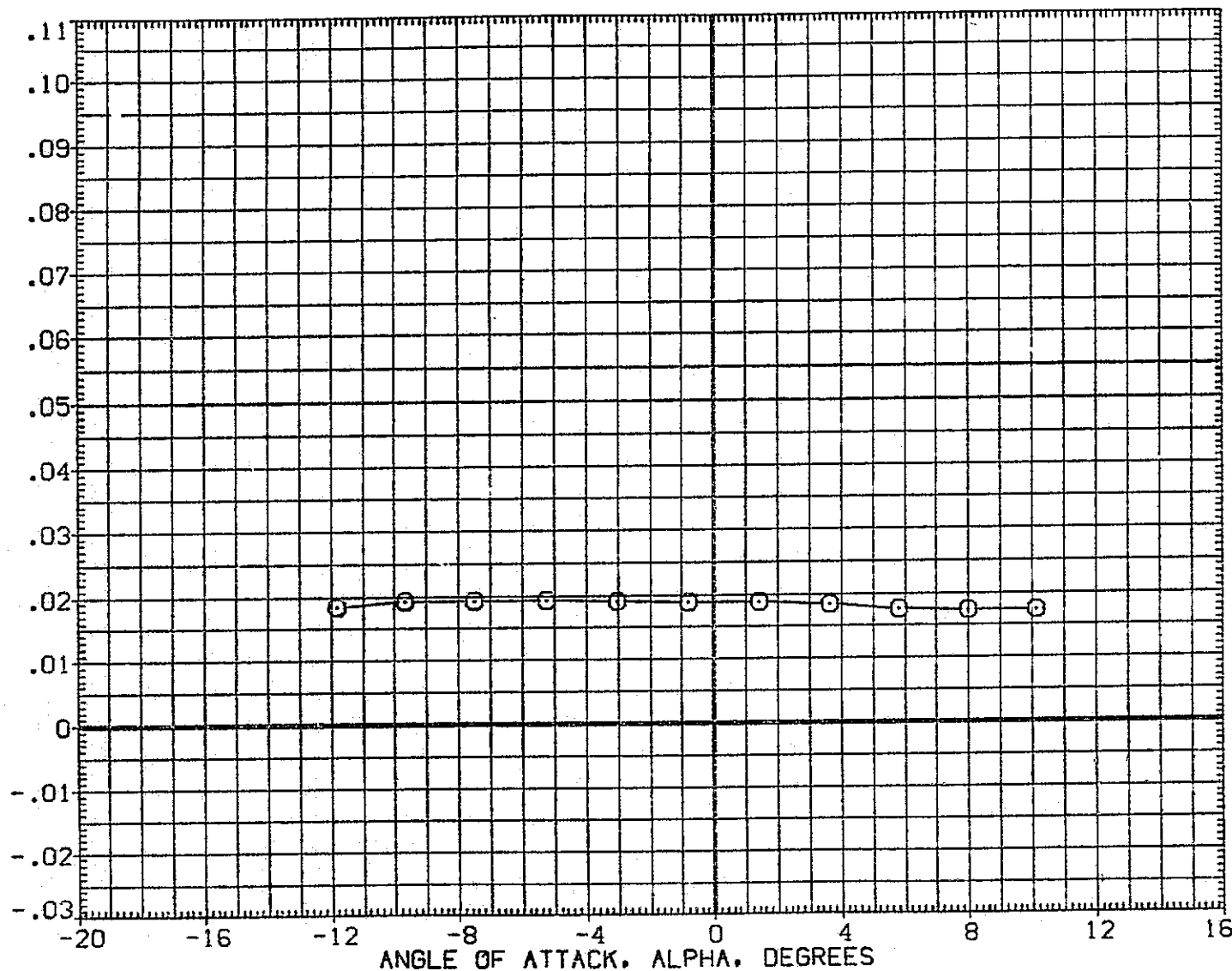


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(1)MACH = 2.99

SRB BASE AXIAL FORCE COEFFICIENT, CABS

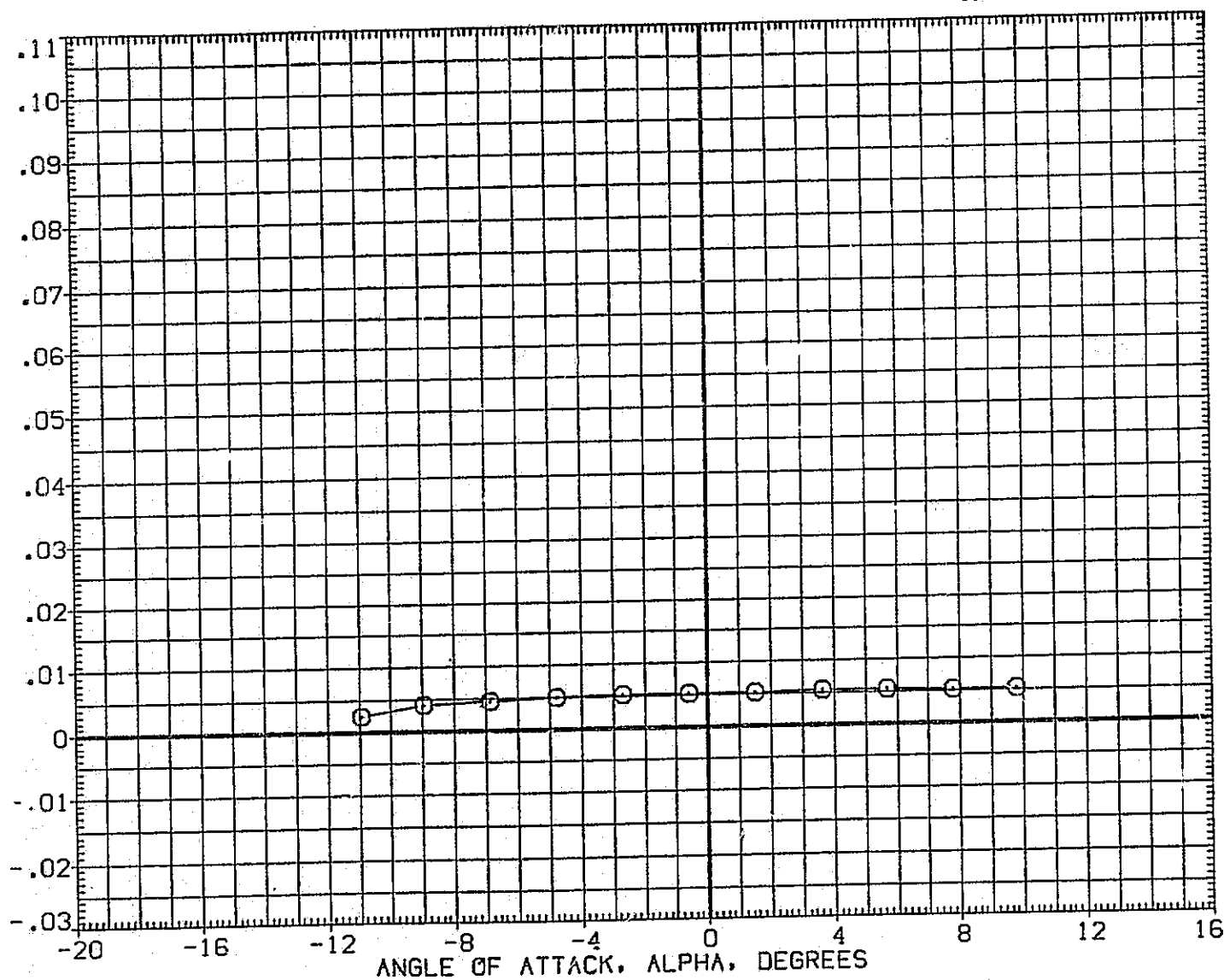


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (J)MACH = 4.96

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (AIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

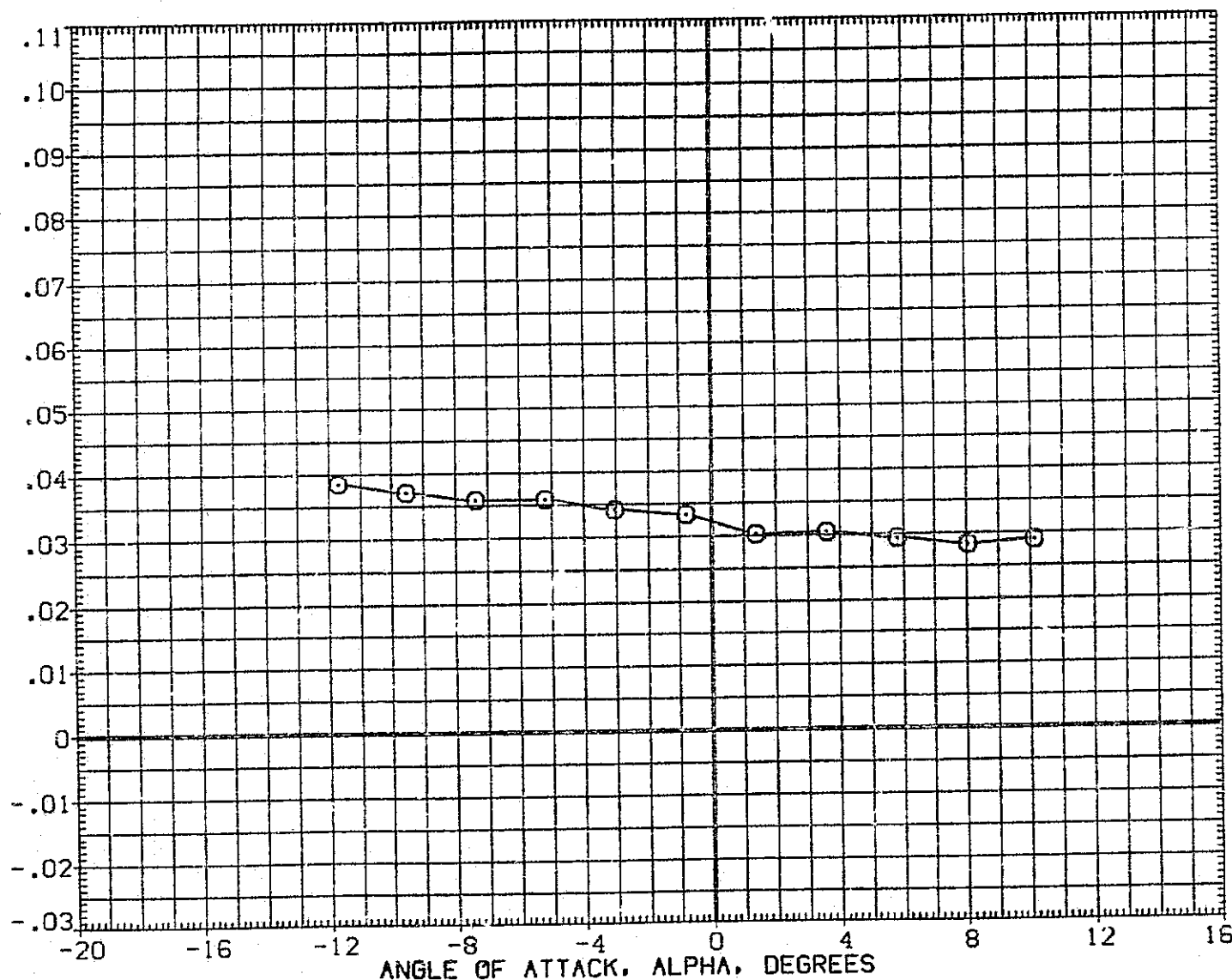


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (A)MACH = .60

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

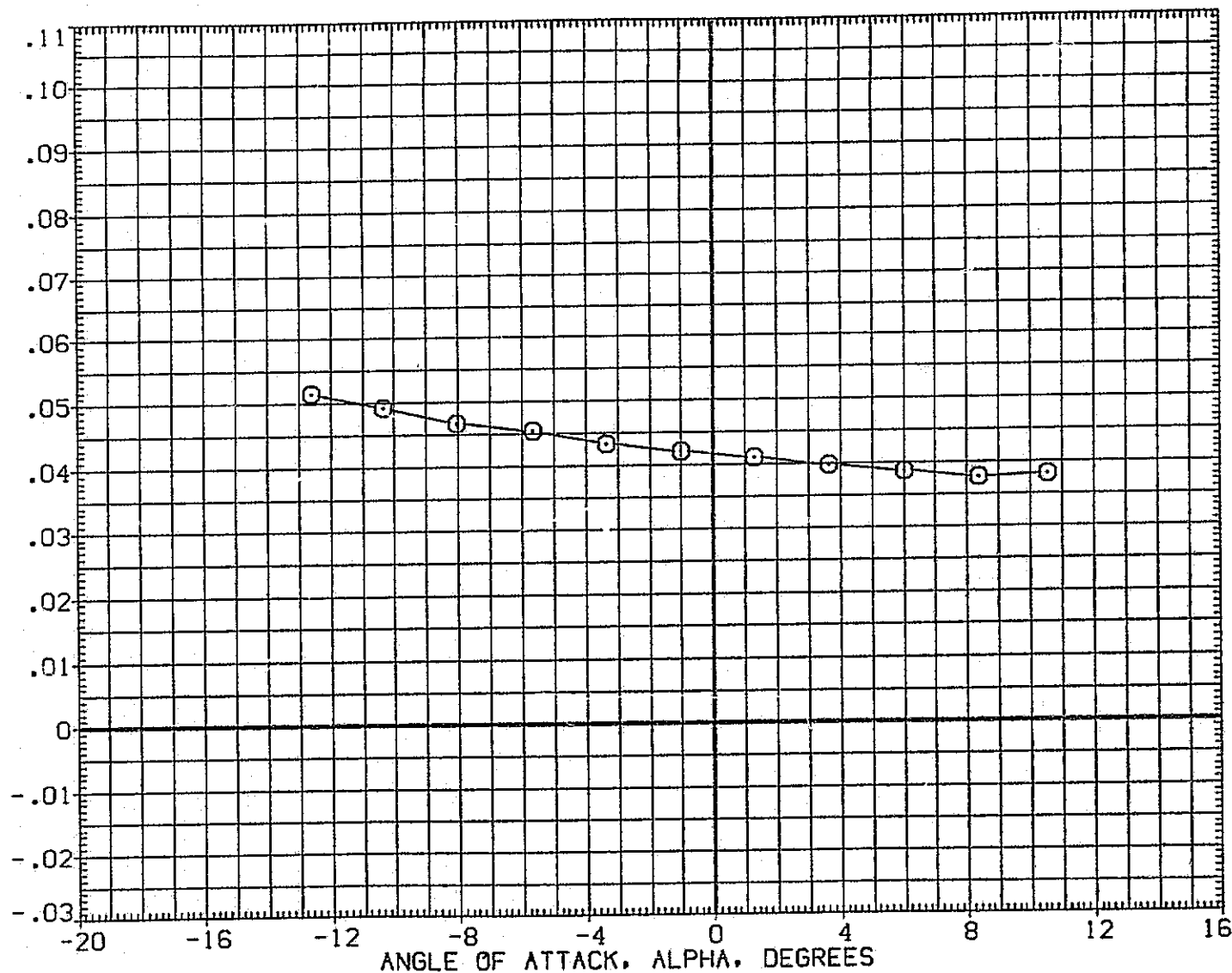


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, $\beta = 0$ DEG

(B)MACH = .80

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (AIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

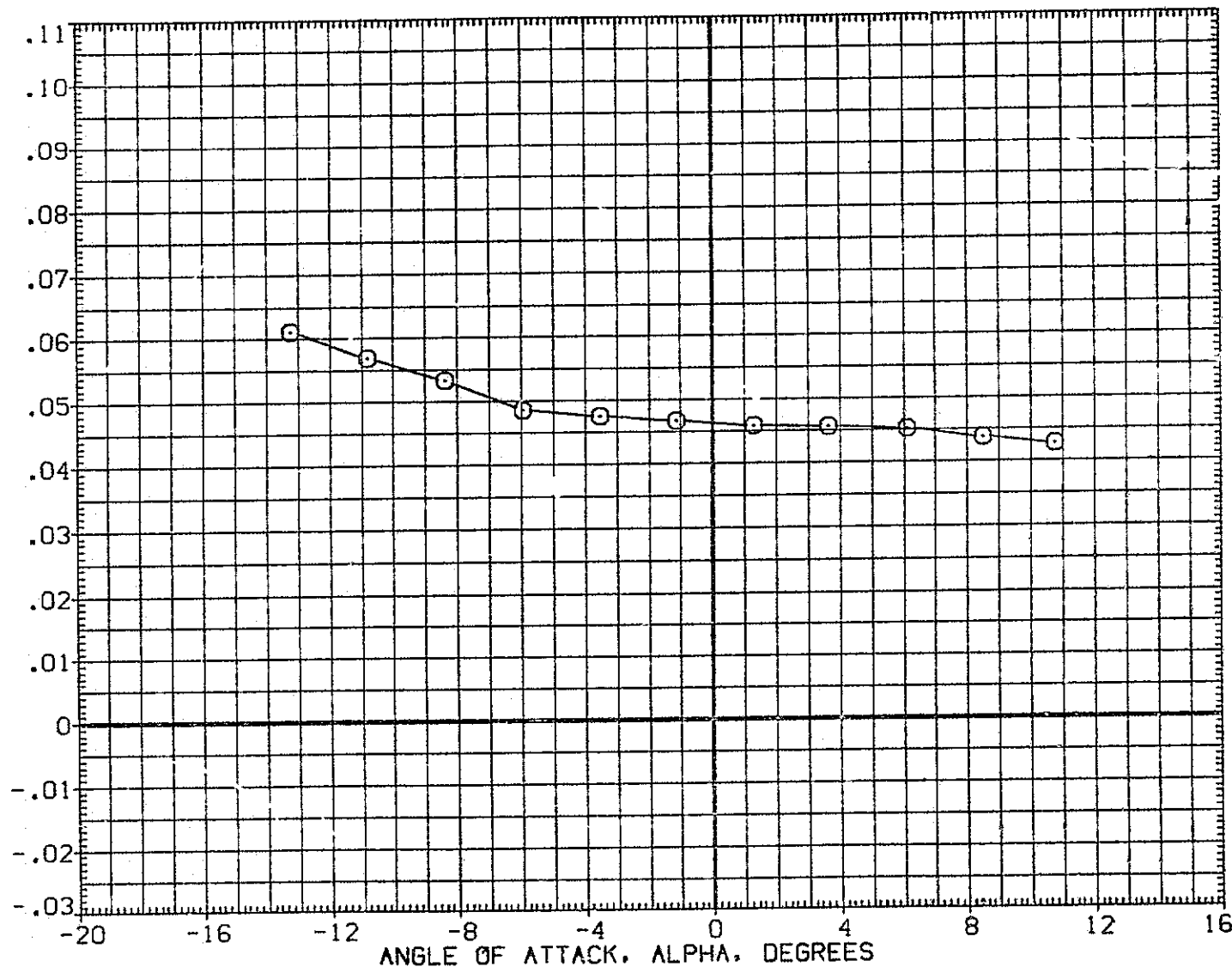


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (C)MACH = .91

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (AIC007) ○ MSFC 594(1A33) 740TS (TIP1SIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

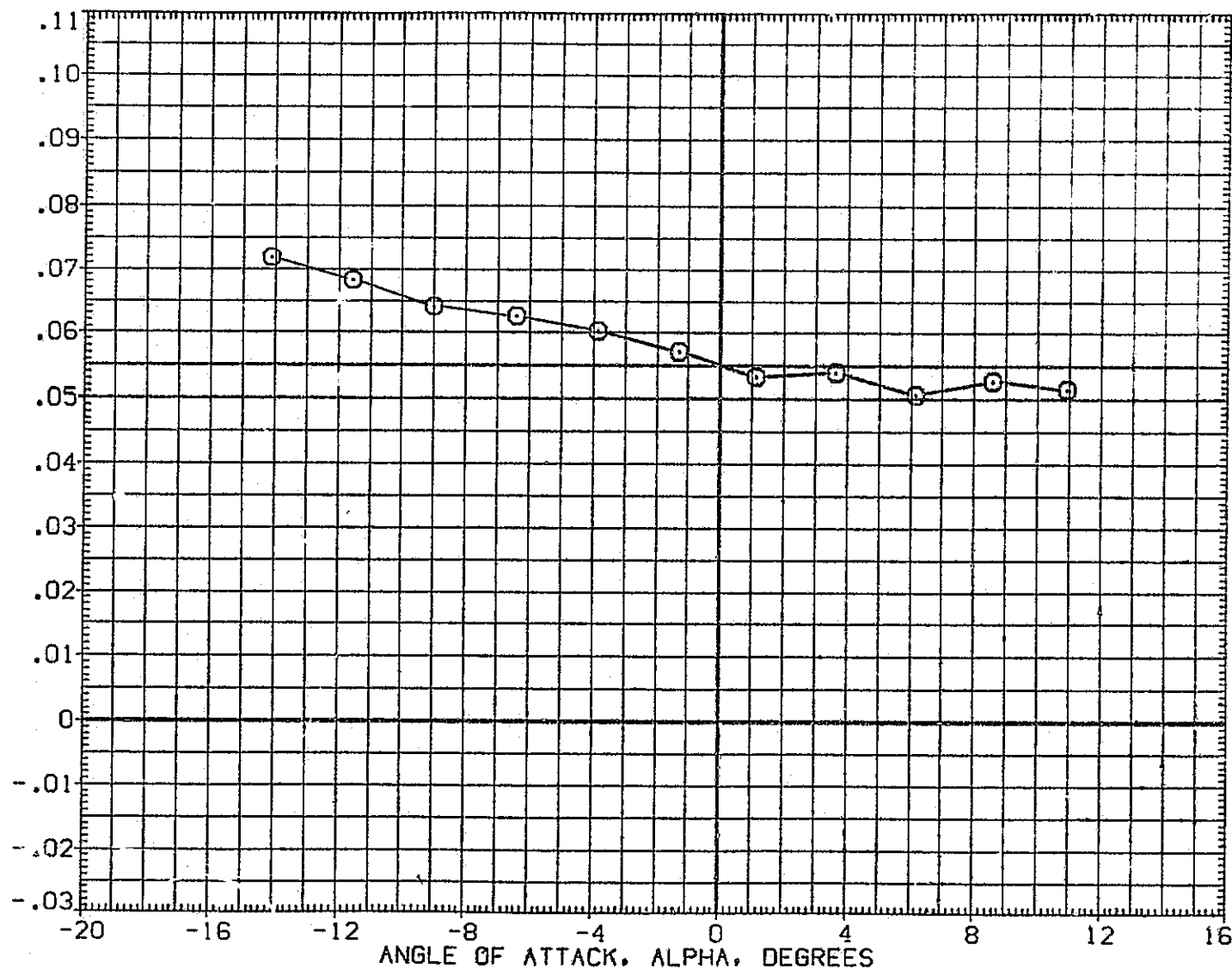


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, $\beta = 0$ DEG

(D)MACH = 1.05

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STRING
 (AIC007) O MSFC 594(A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

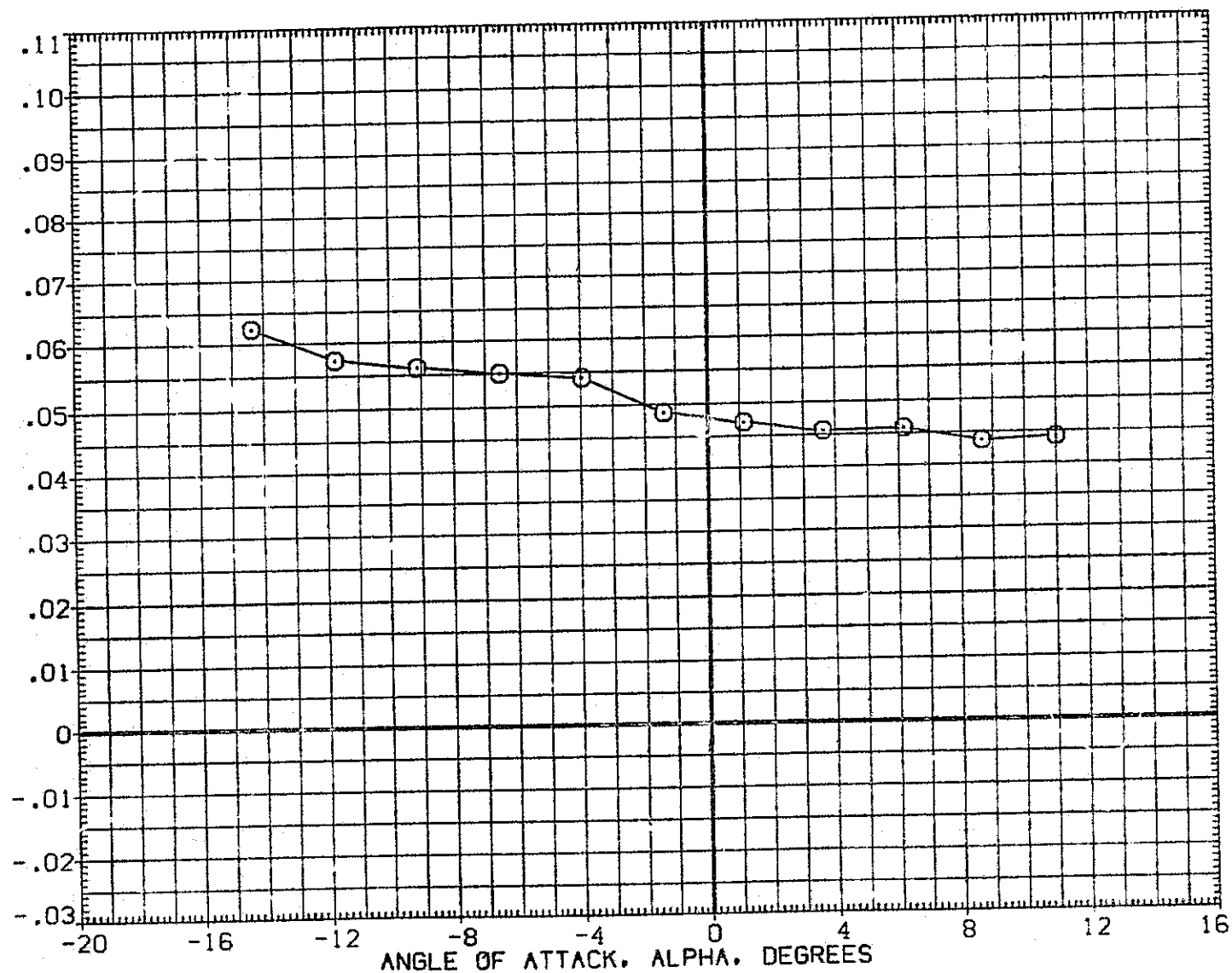


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (E)MACH = 1.10

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (A1C007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{ABO}

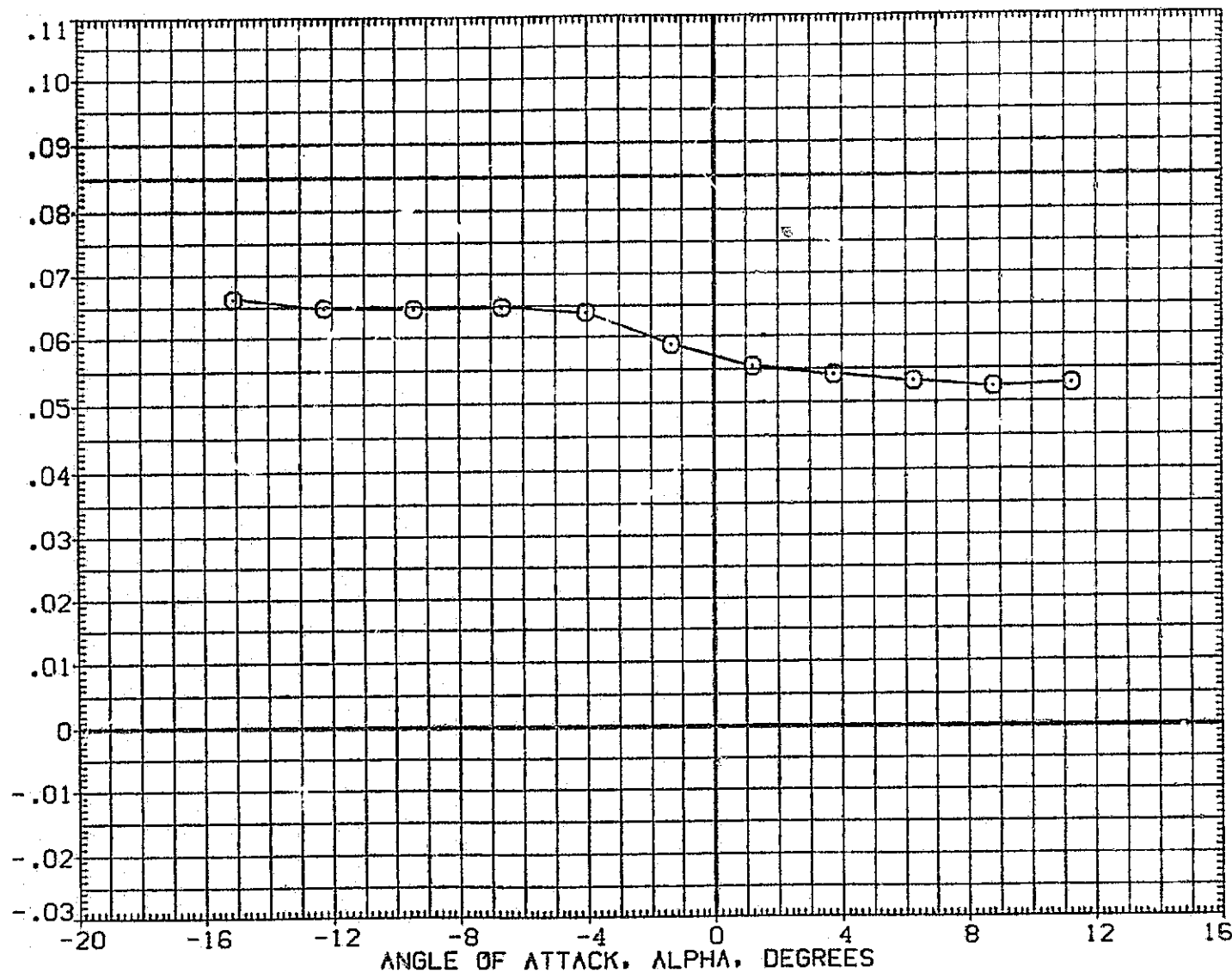


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (F)MACH = 1.25

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (AIC007) O MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

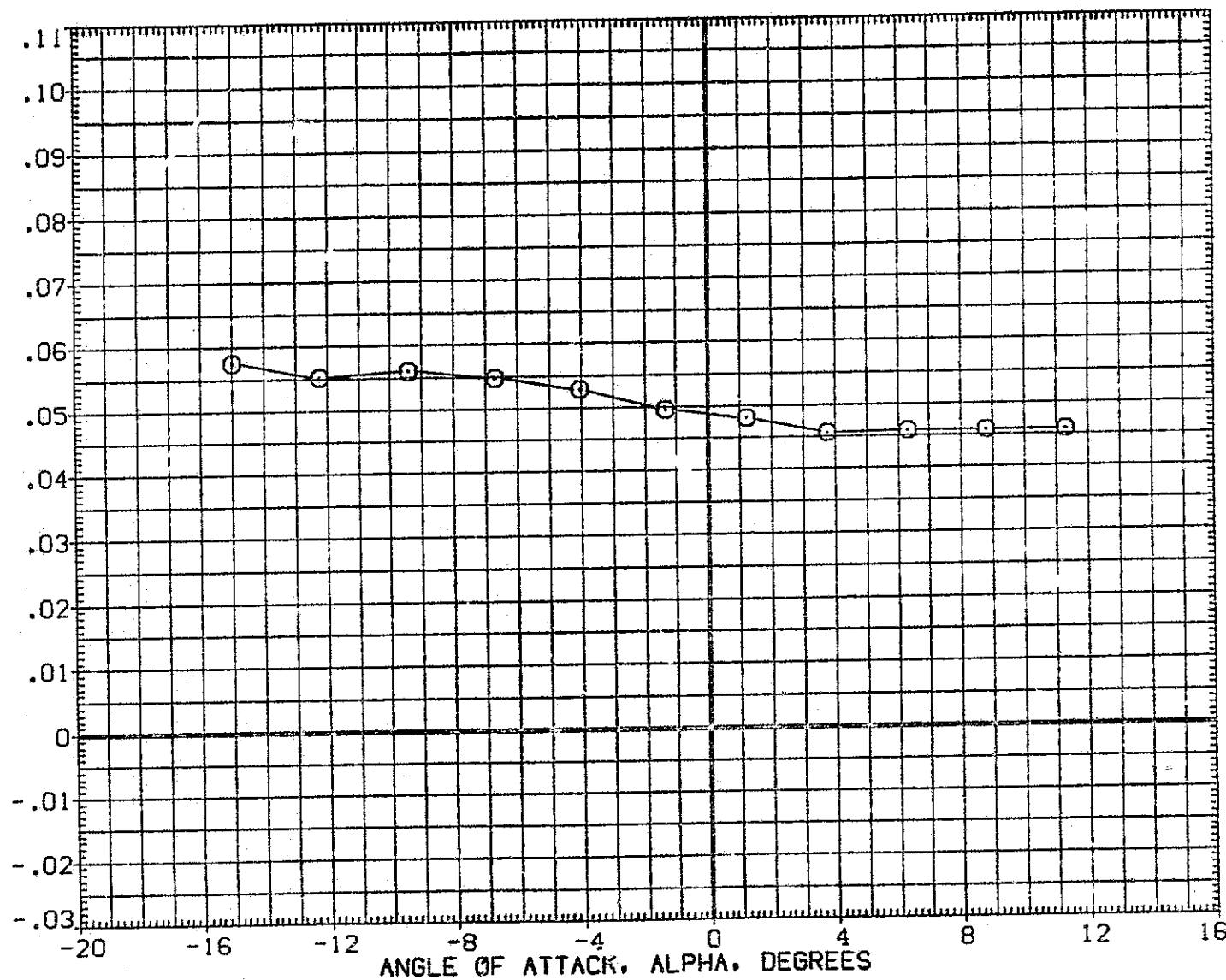


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, $\beta = 0$ DEG
 (G)MACH = 1.46

DATA SET SYMBOL CONFIGURATION DESCRIPTION
(A1C007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
SREF 2690.0000 SQ. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0040

ORBITER BASE AXIAL FORCE COEFFICIENT, CABO

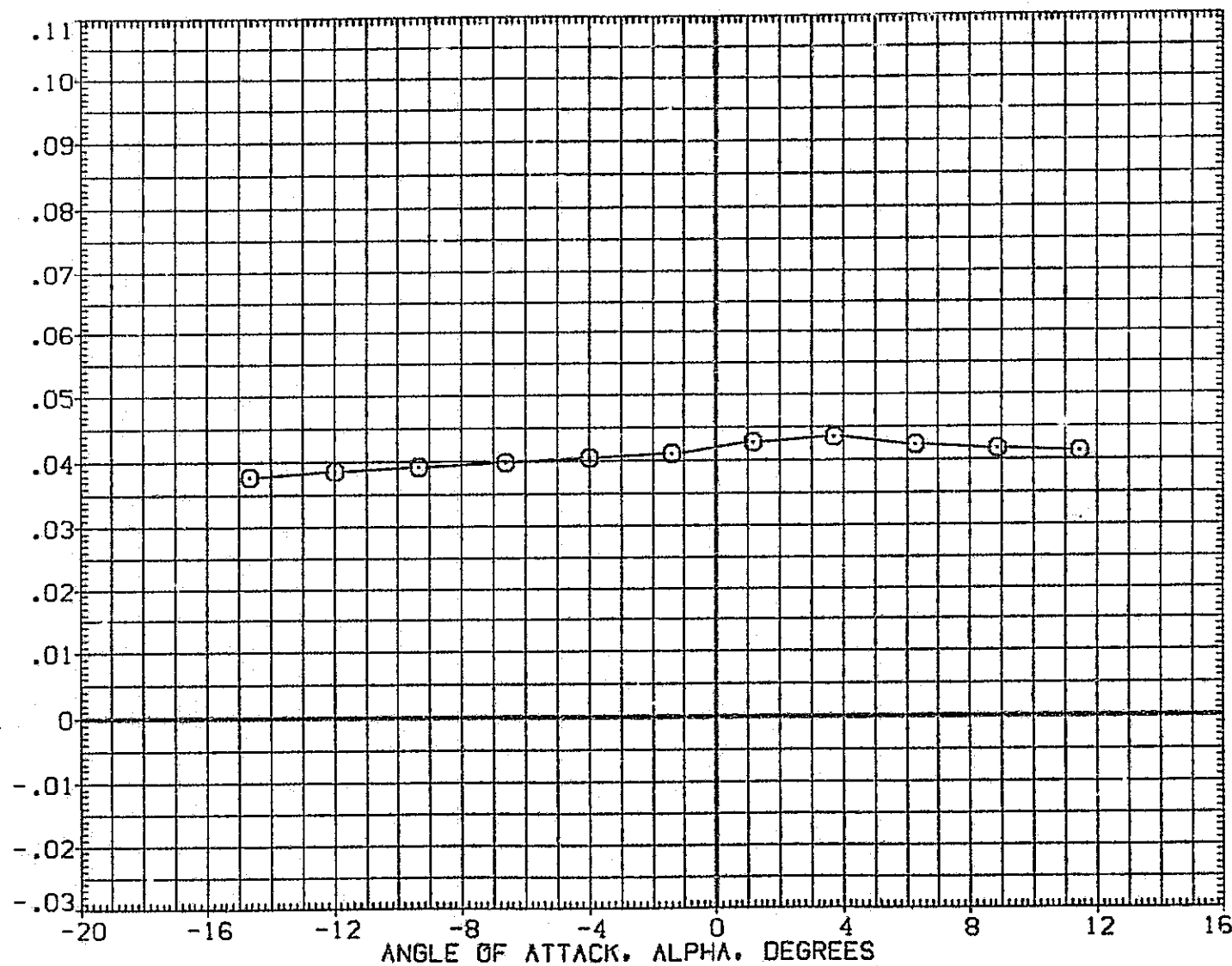


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(H)MACH = 1.97

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (AIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{ABO}

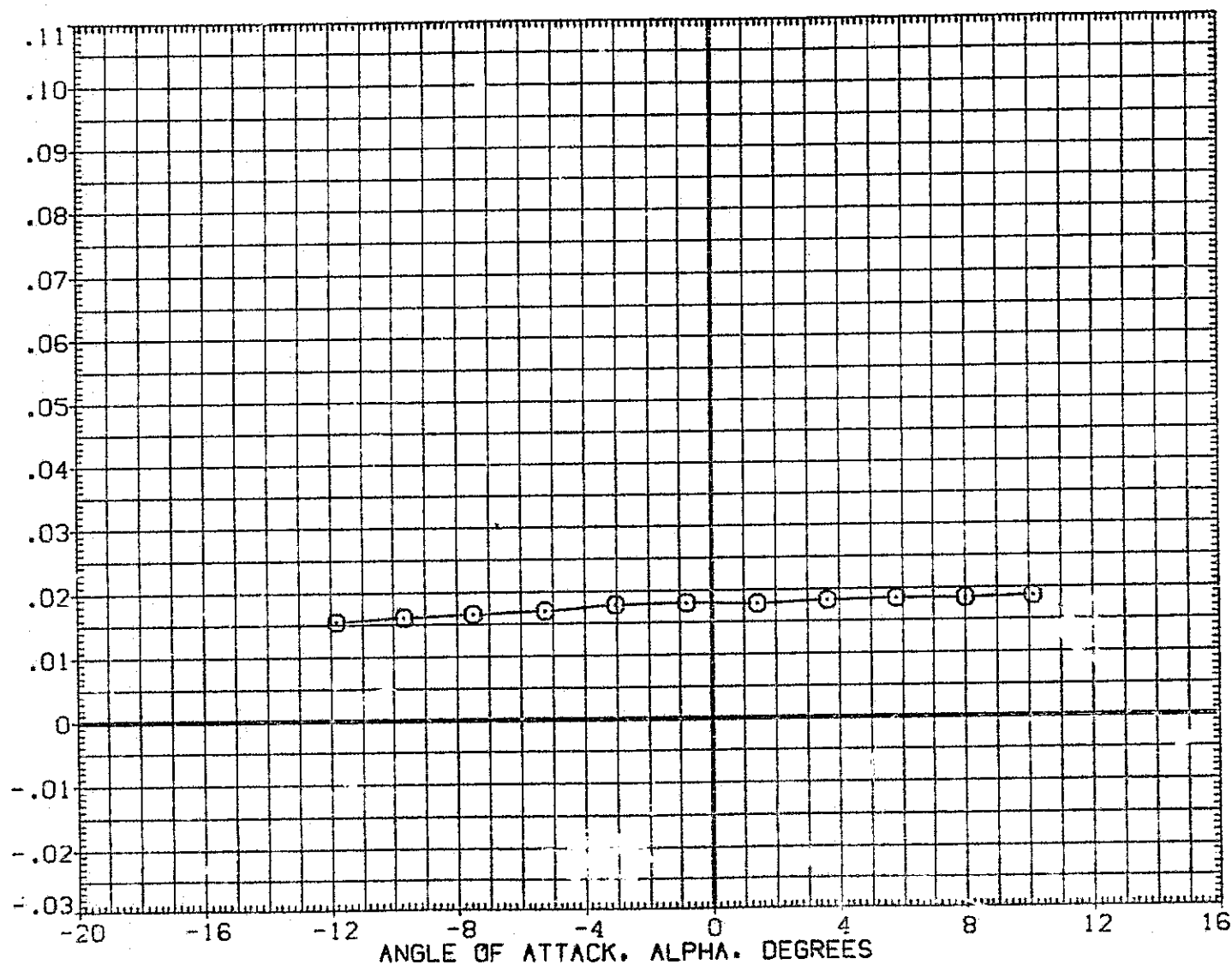


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (1)MACH = 2.99

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

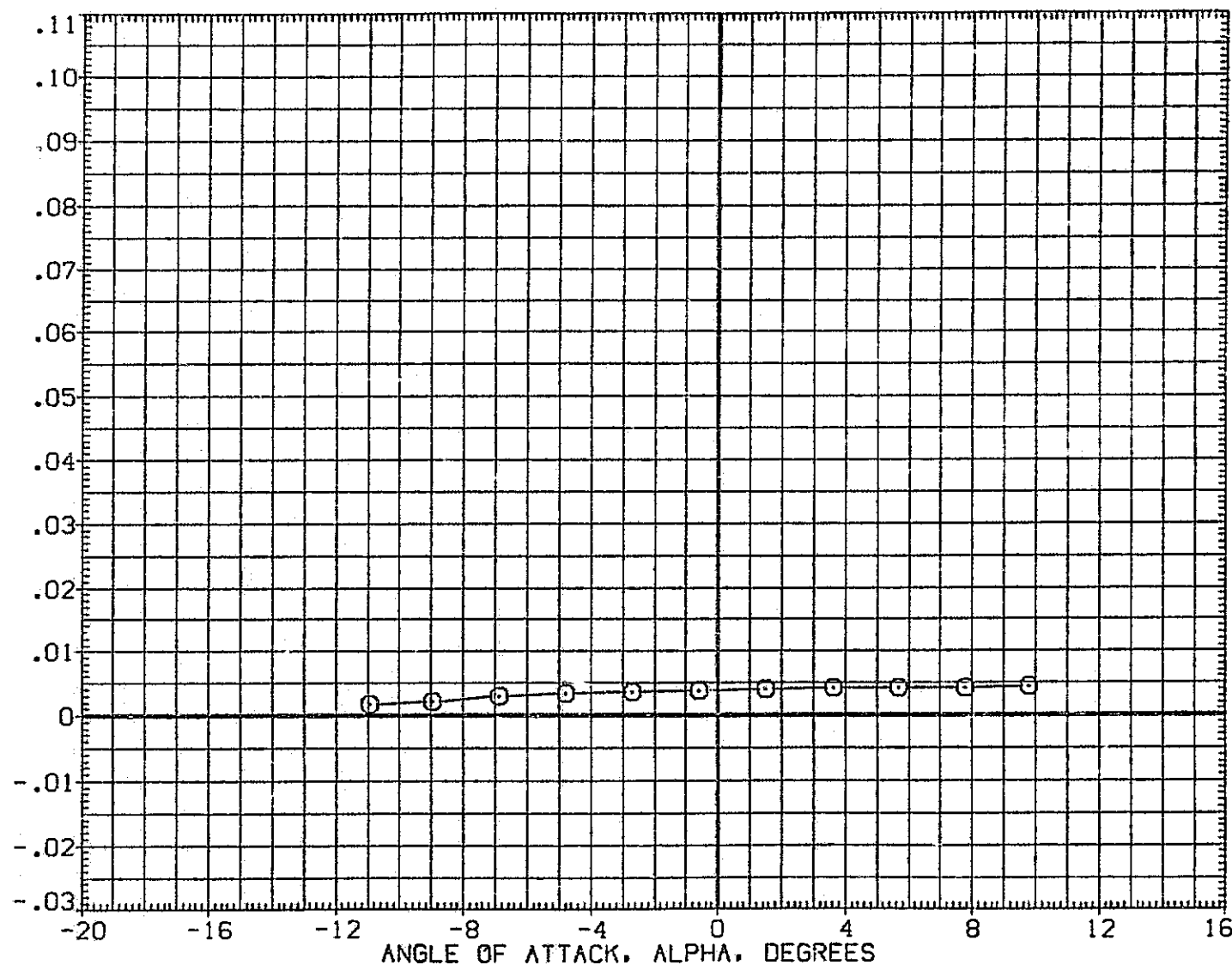


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(J)MACH = 4.96

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
(VIC007) O MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
SREF 2690.0000 SQ. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

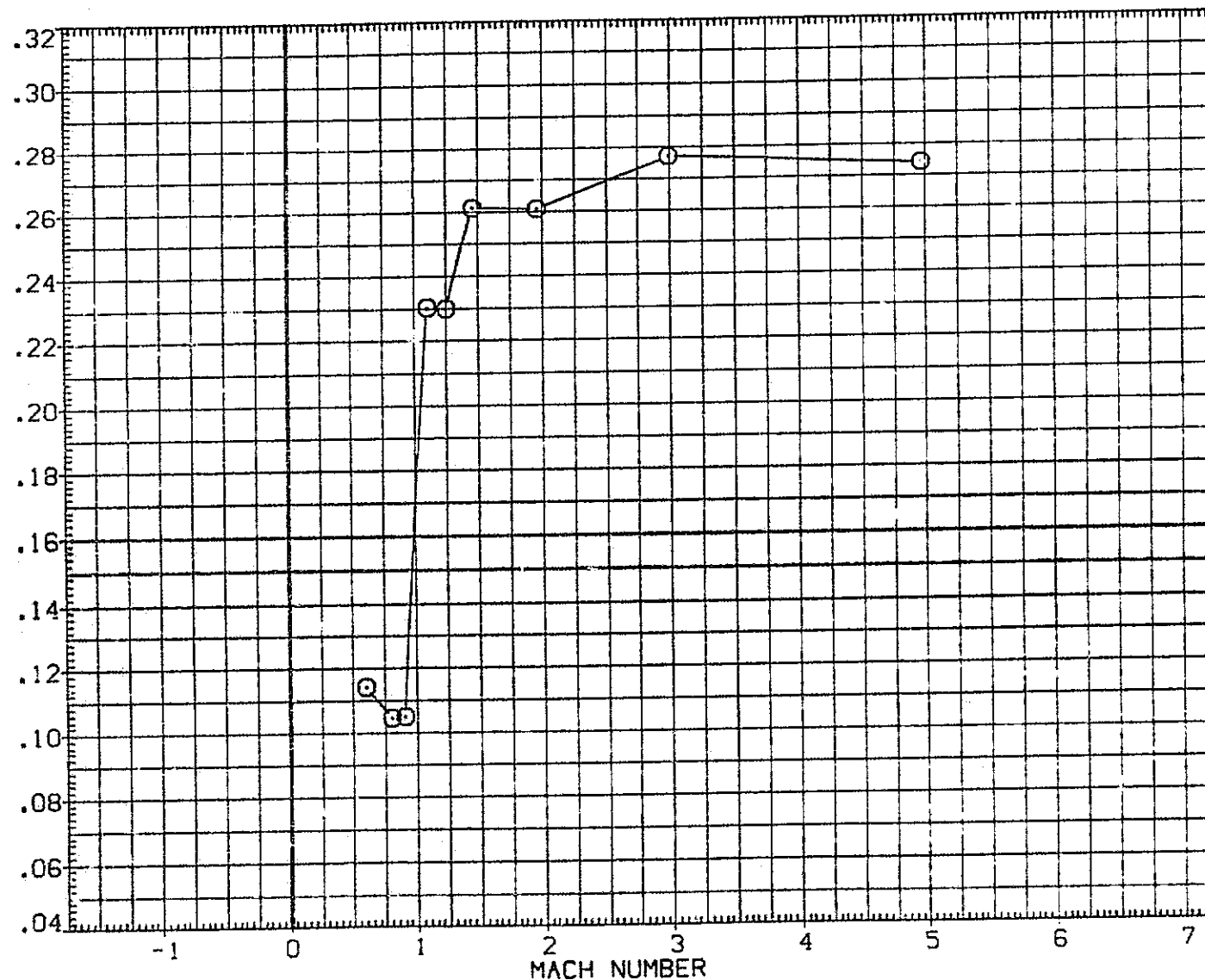


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(A) ALPHA = -10.00

C.4

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
(VIC007) O MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
SREF 2690.0000 SQ. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

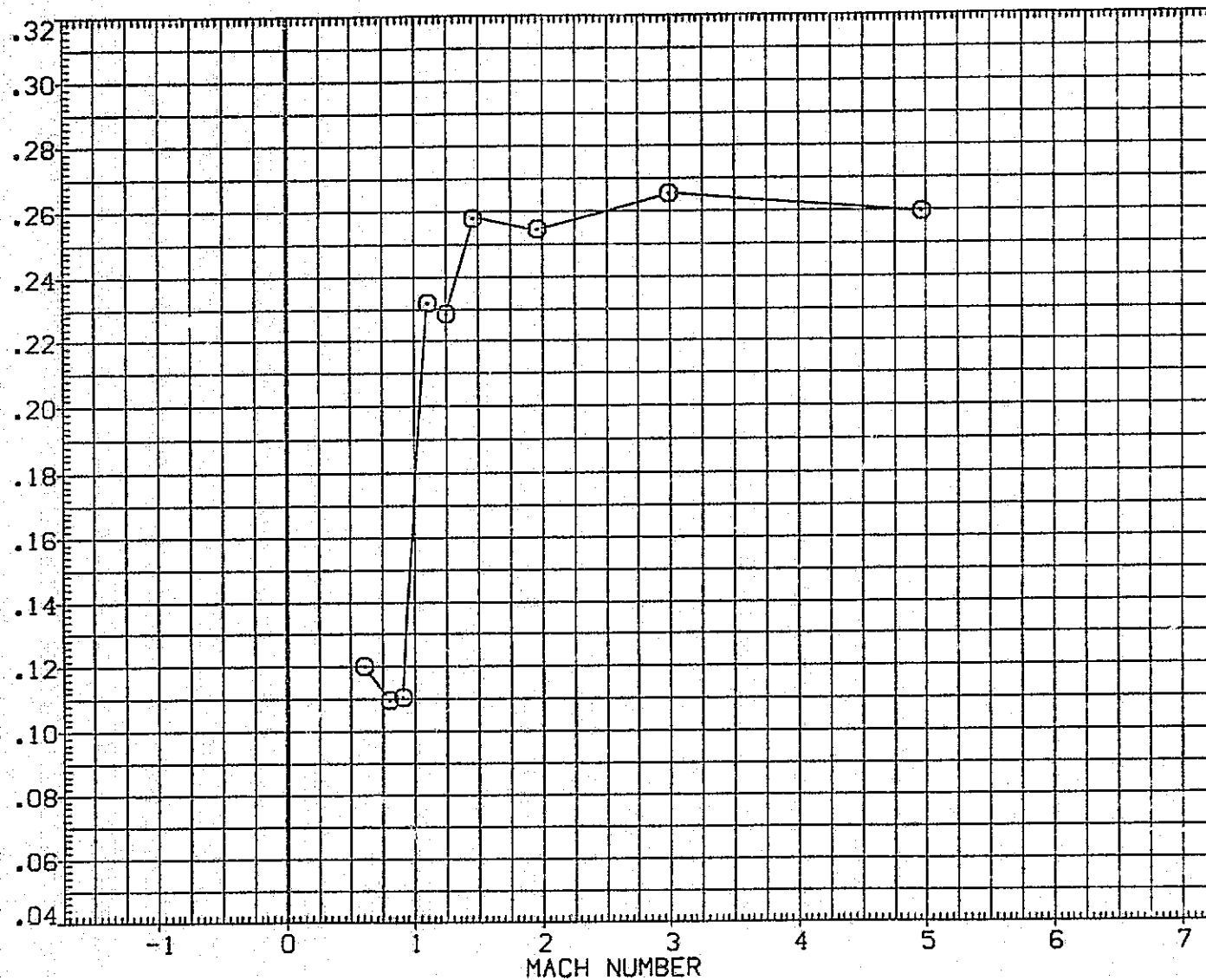


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(B) ALPHA = -8.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

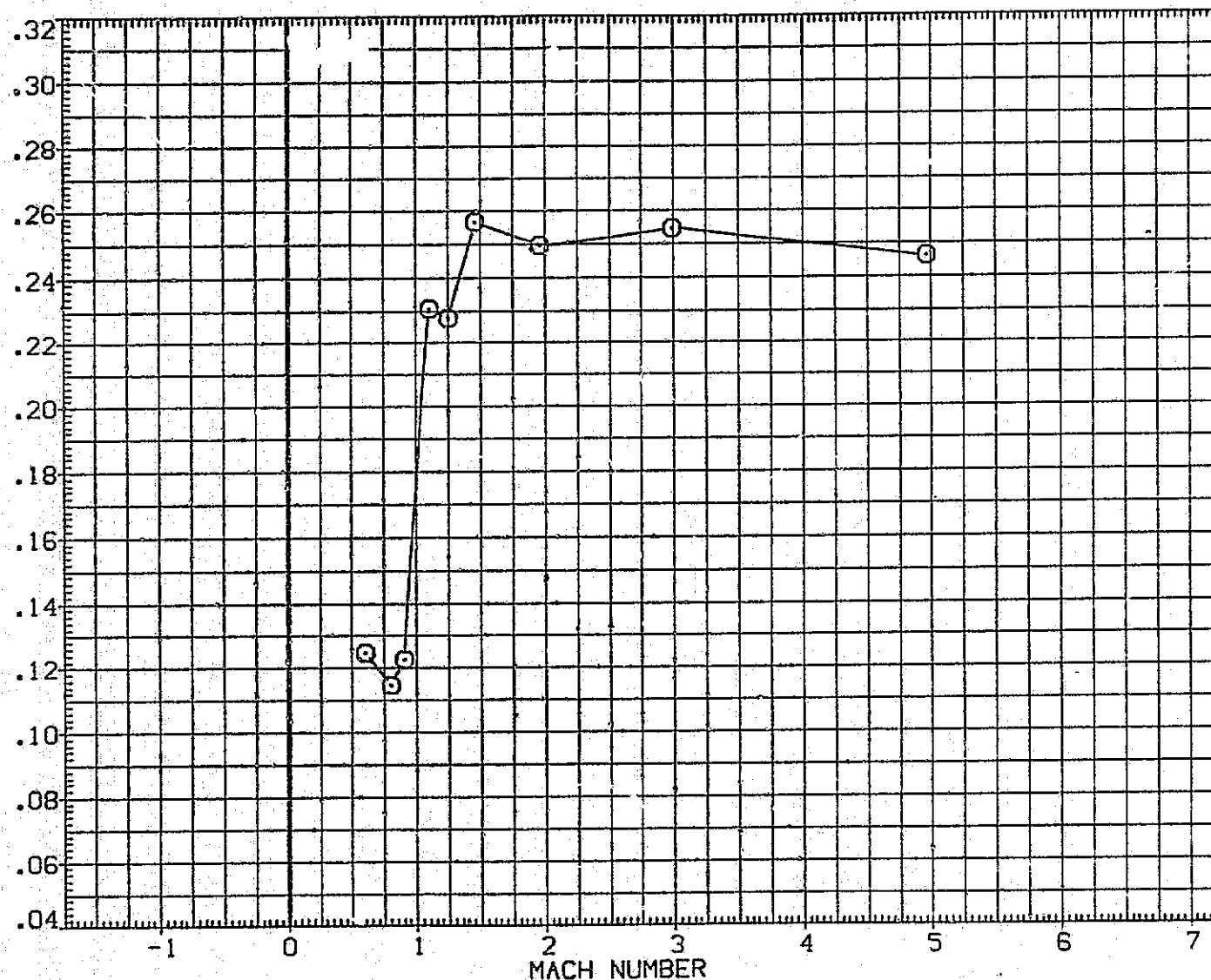


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (C) ALPHA = -6.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (V1C007) ○ MSFC 594(1A33) 740TS (TIPIS1P201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

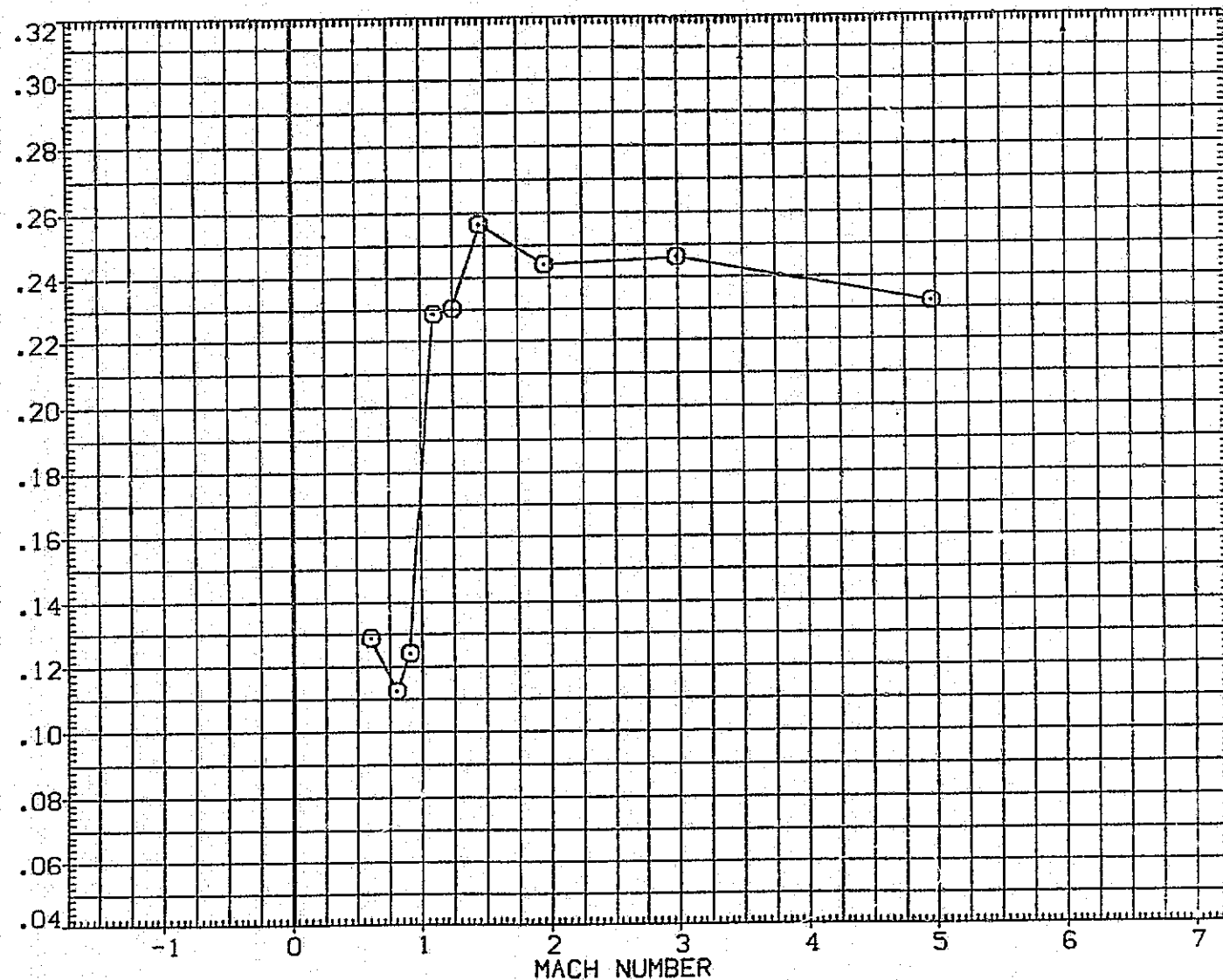


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (D) ALPHA = -4.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(1A33) 740TS (TIP1SIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

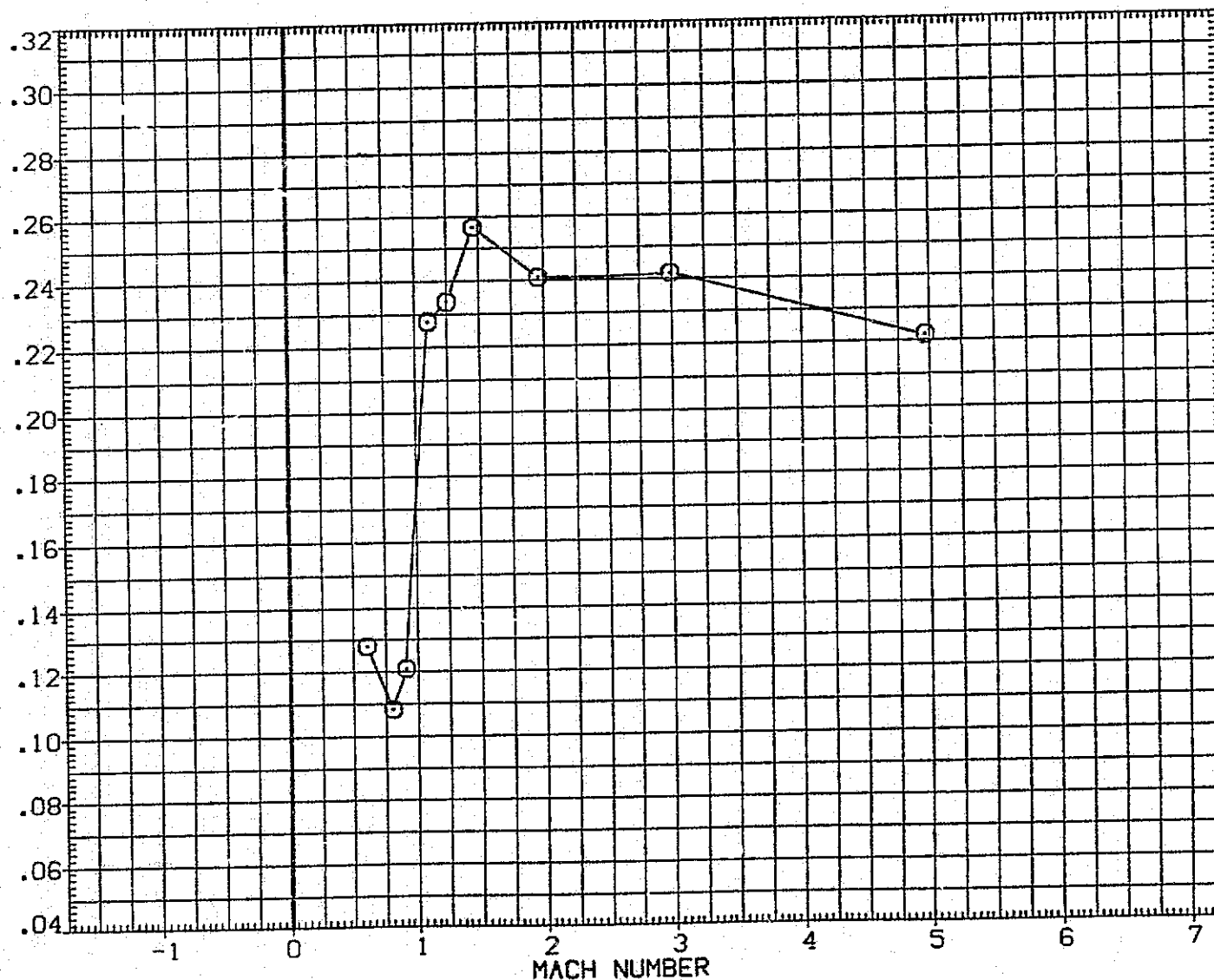


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (E) ALPHA = -2.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(1A33) 740TS (TIPIS1P201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

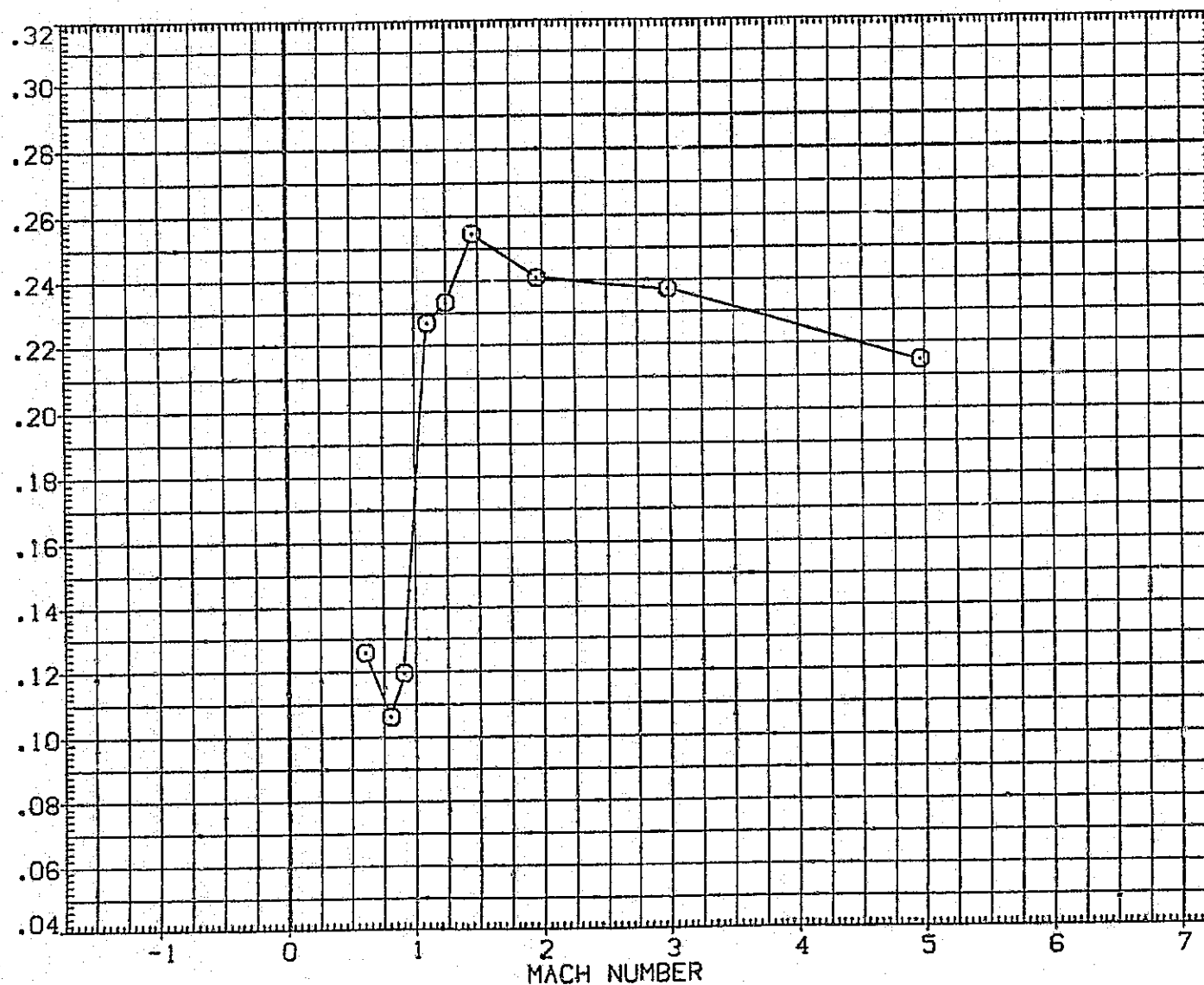


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(F) ALPHA = .00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(1A331 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

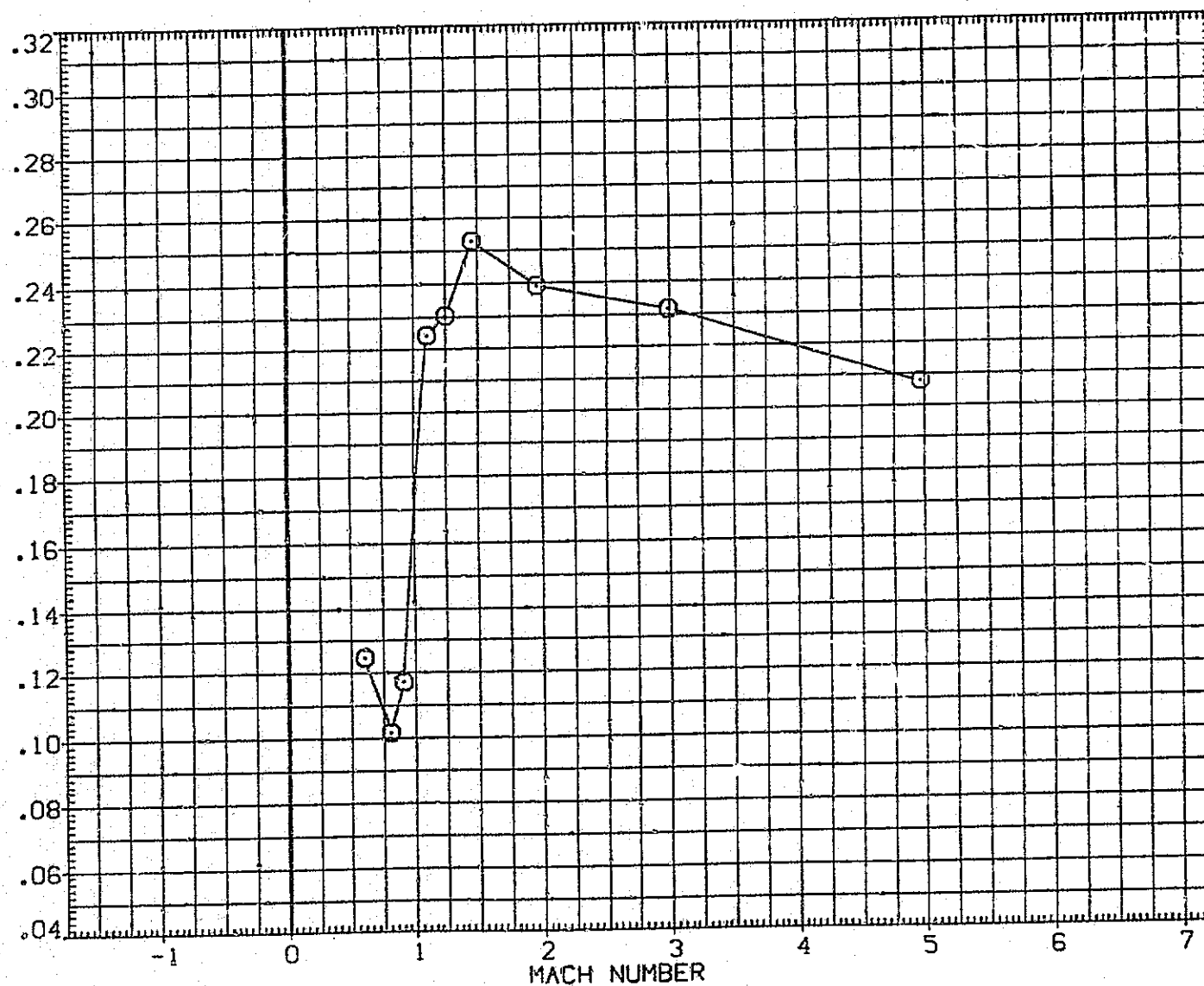


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (G) ALPHA = 2.00

FOREBODY AXIAL FORCE COEFFICIENT, CAF

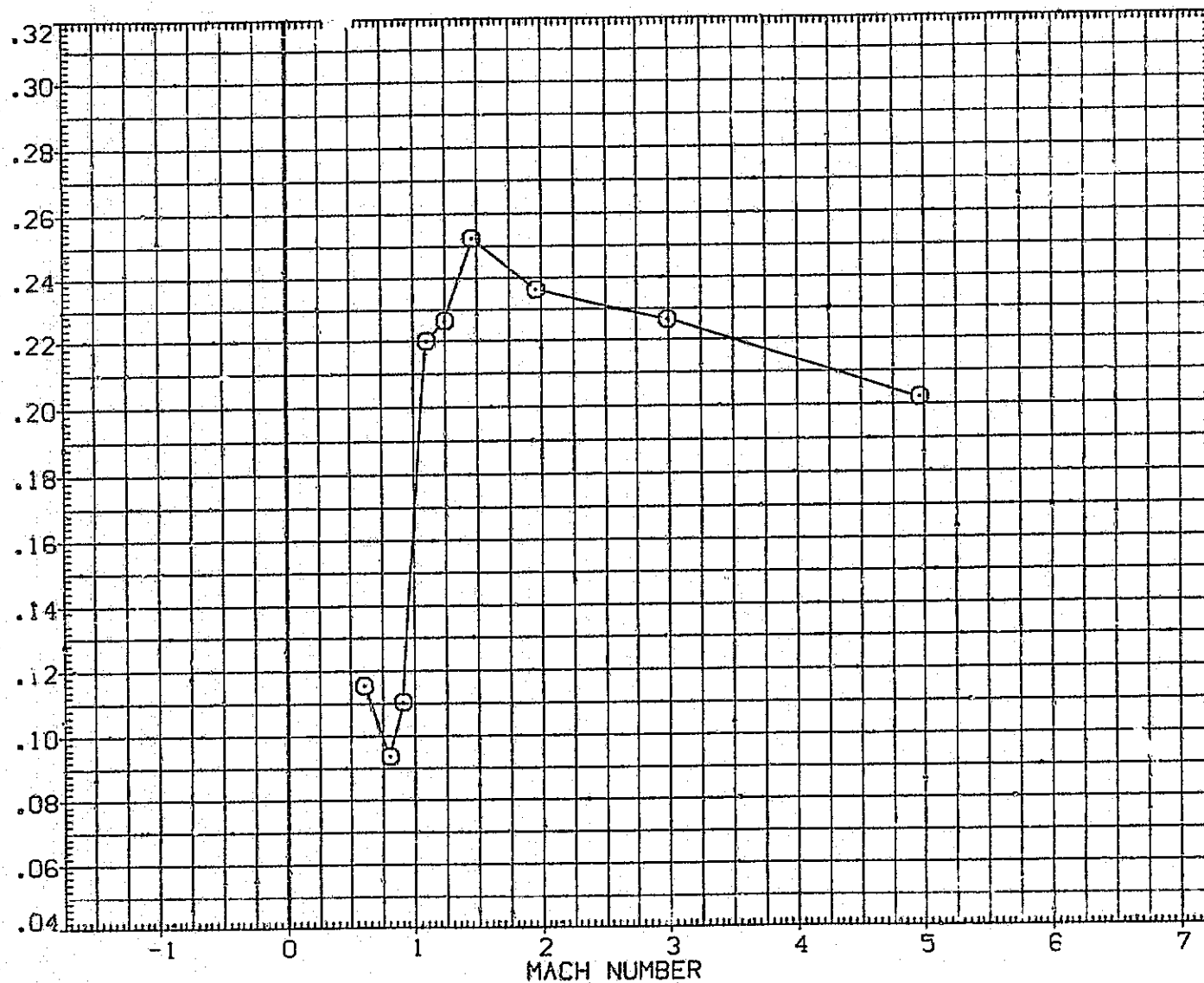


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(H) ALPHA = 4.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPIS(P201))

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

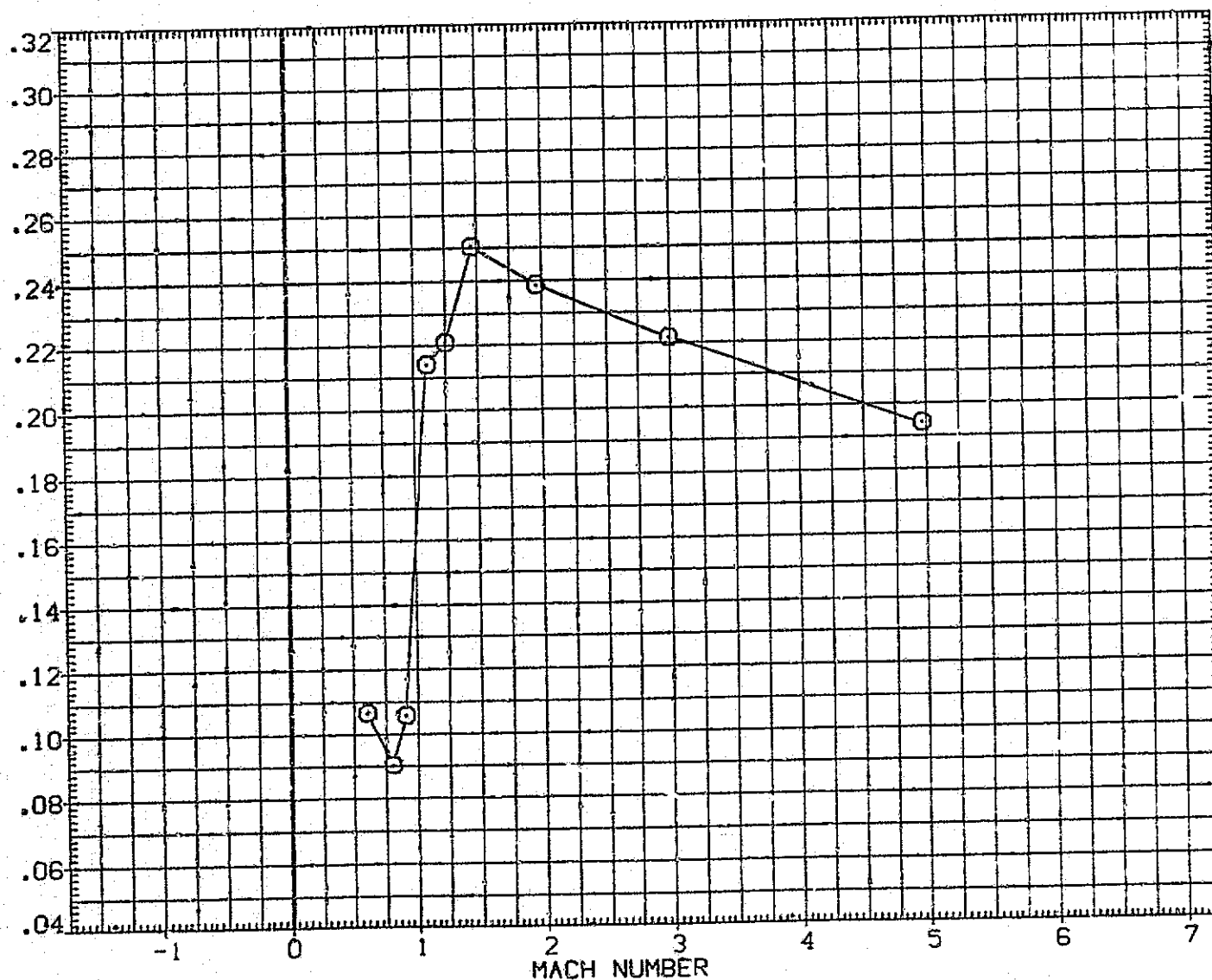


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(1) ALPHA = 6.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) ○ MSFC 594(1A33) 740TS (FIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 50. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

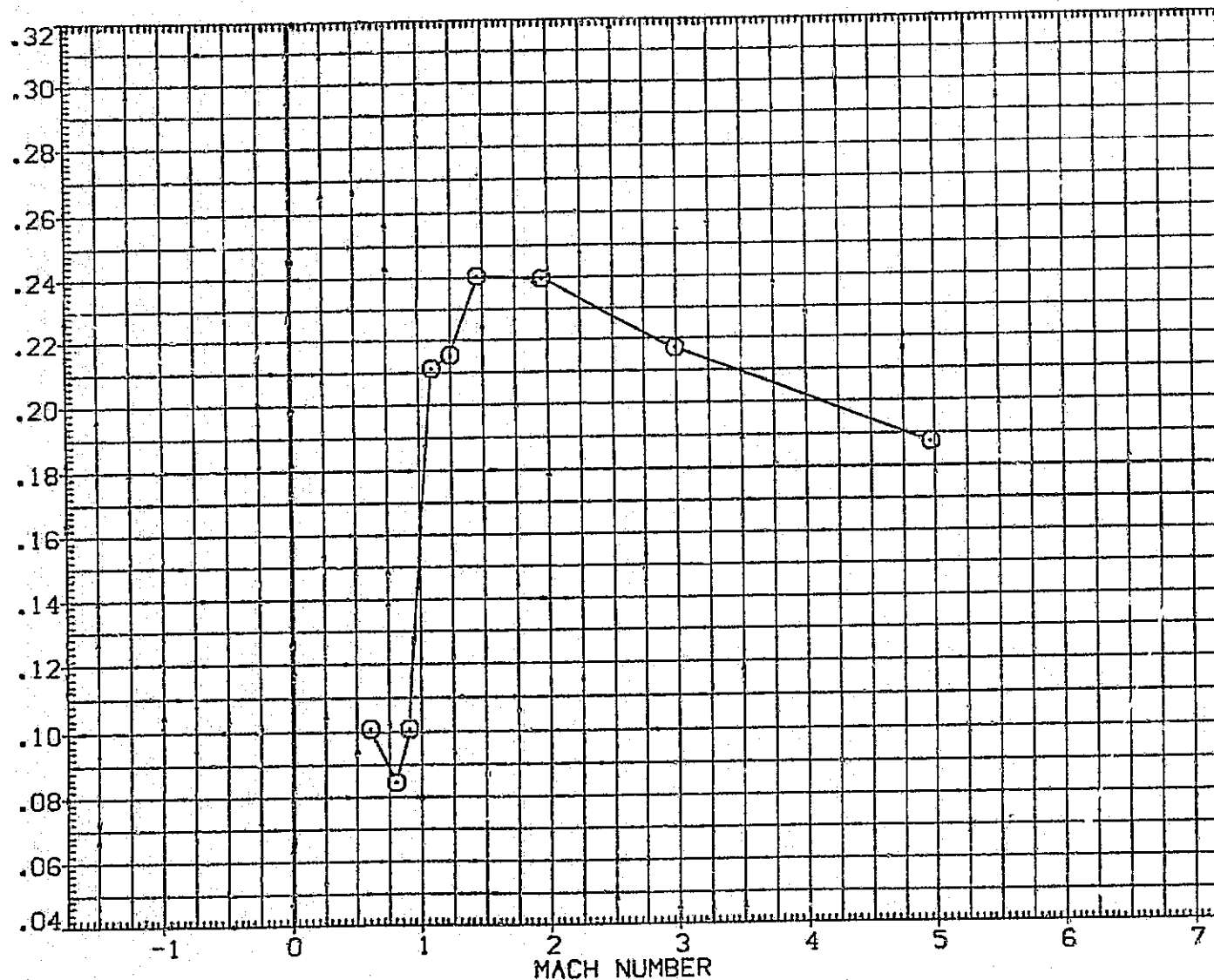


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (JJALPHA = 0.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201) OR8 STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

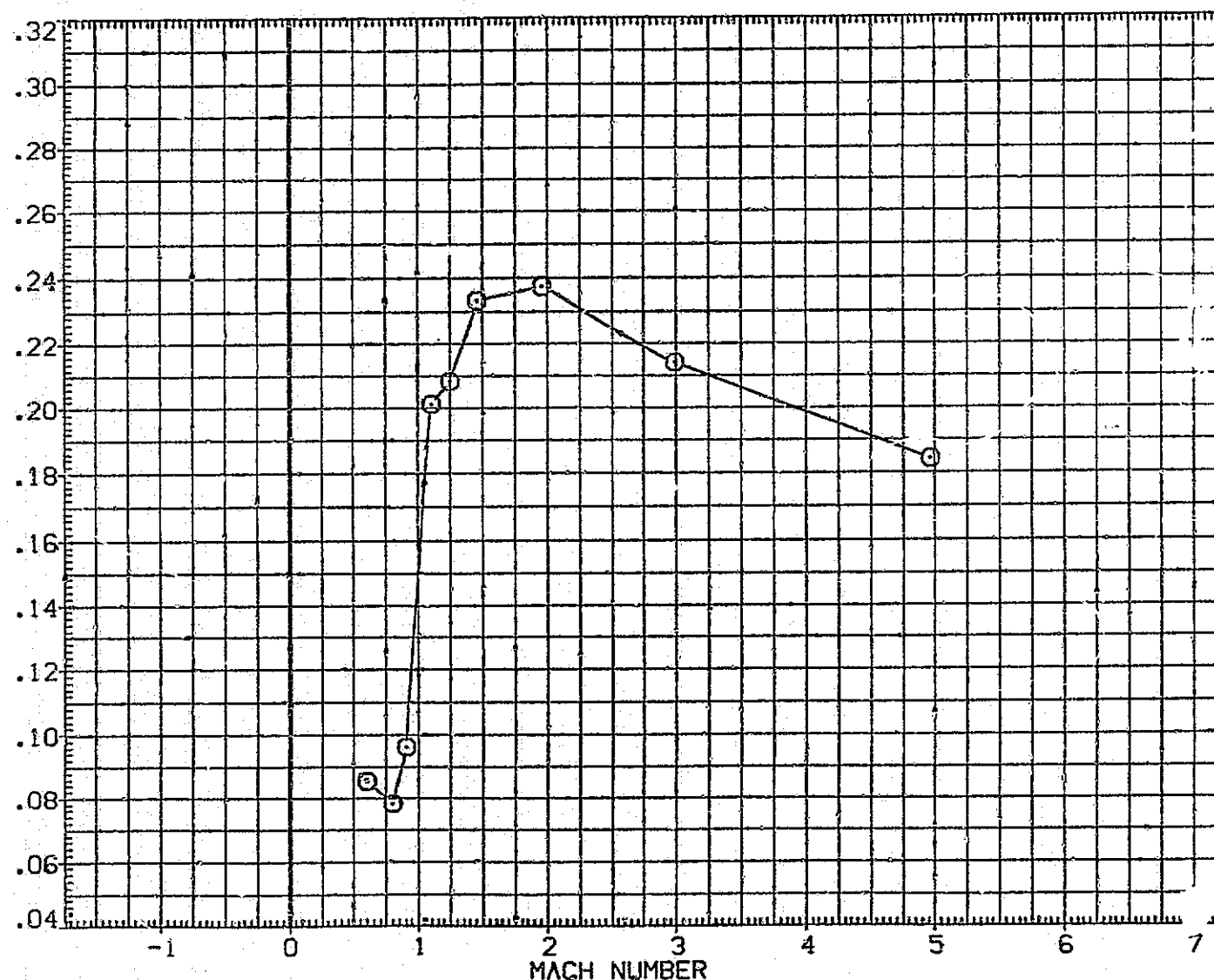


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (K) ALPHA = 10.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) ○ MSFC 594(1A33) 740TS (T1P1S1P201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, C_{AS}T

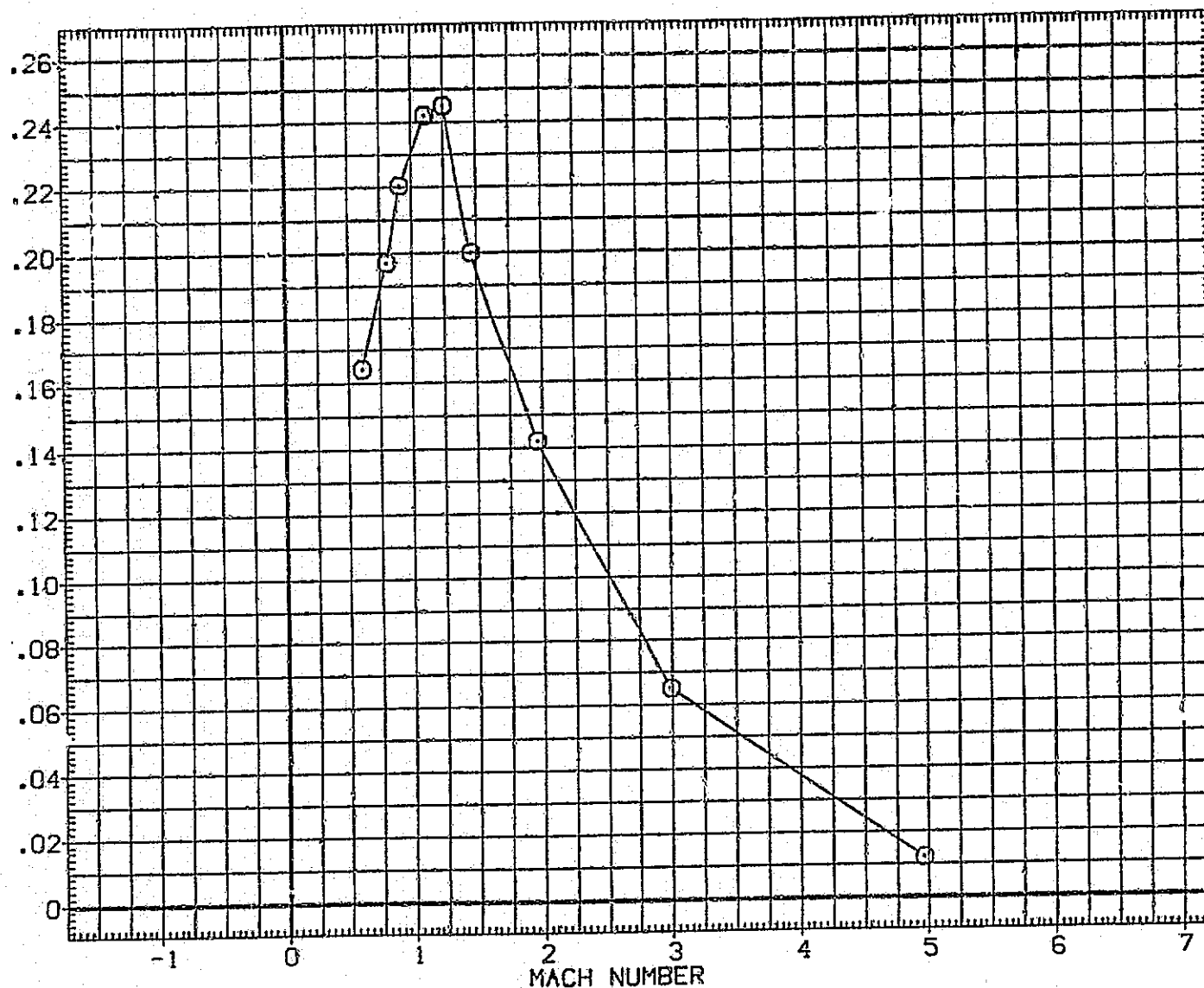


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (A) ALPHA = -10.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

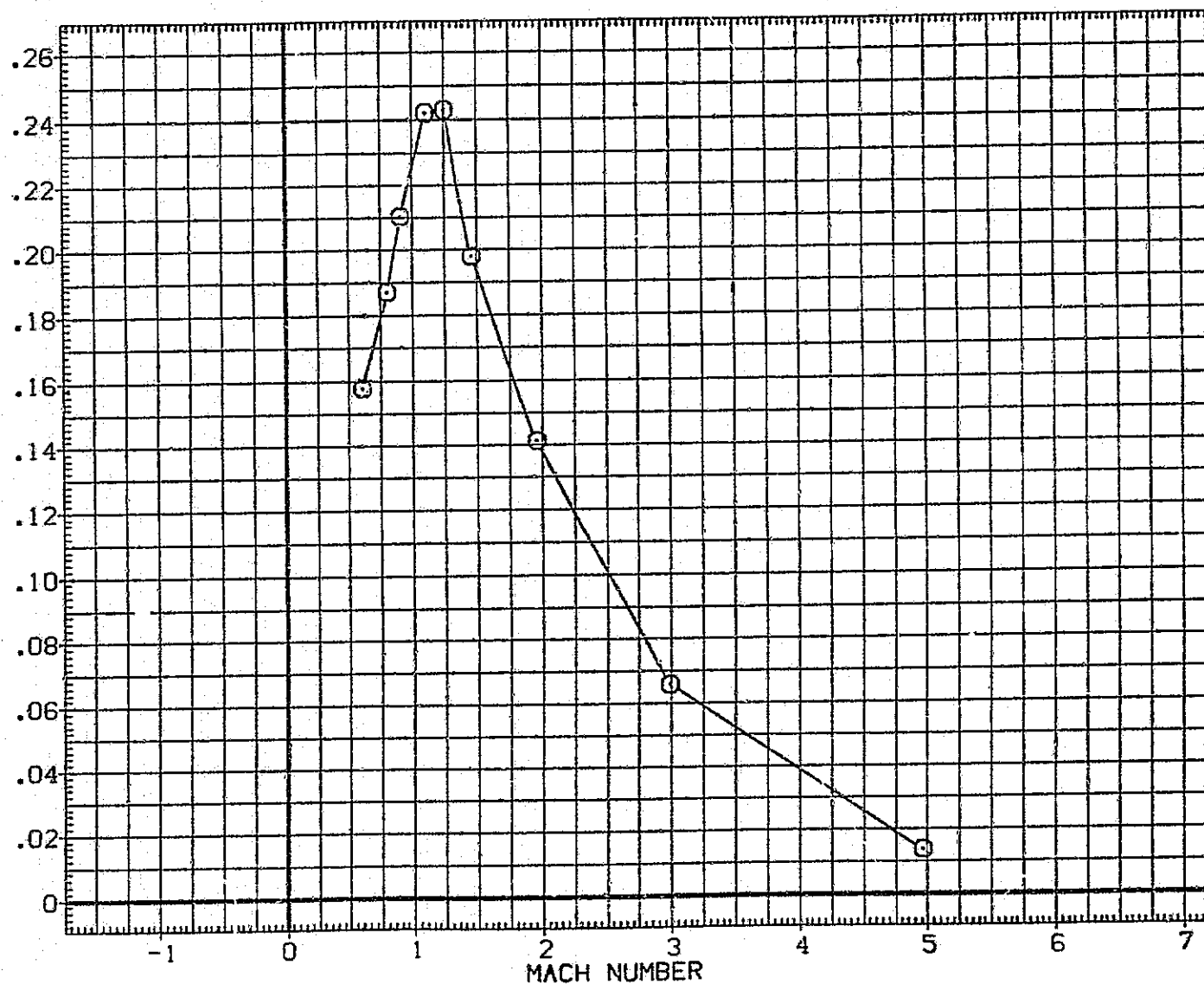


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (B) ALPHA = -8.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

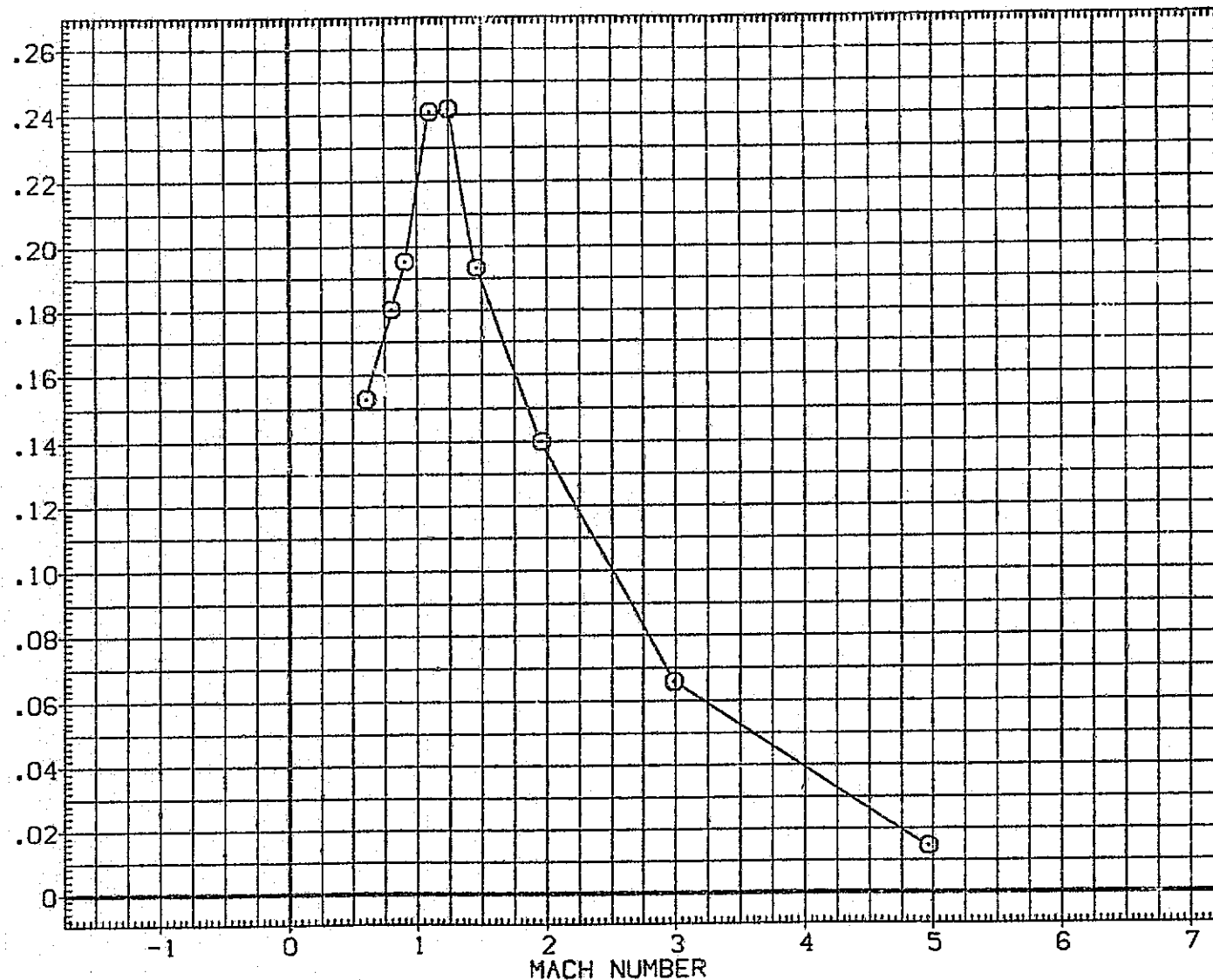


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (C) ALPHA = -6.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
(VIC007) O MSFC 594(IA33) 7401S (TIPISIP201)

REFERENCE INFORMATION
SREF 2690.0000 SQ. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0040

SUM OF THE ORB. ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

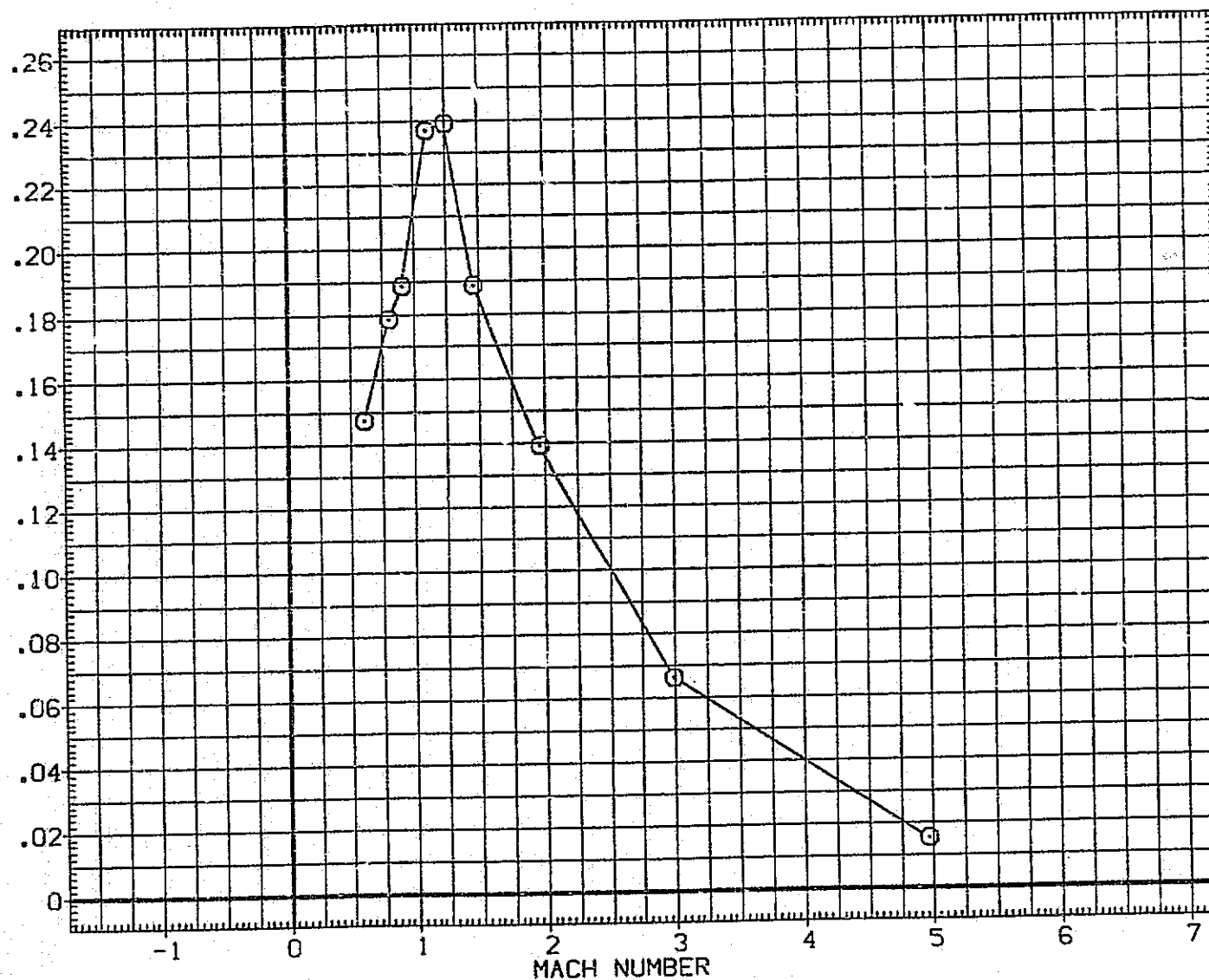


FIG 5 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(D) ALPHA = -4.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT.
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

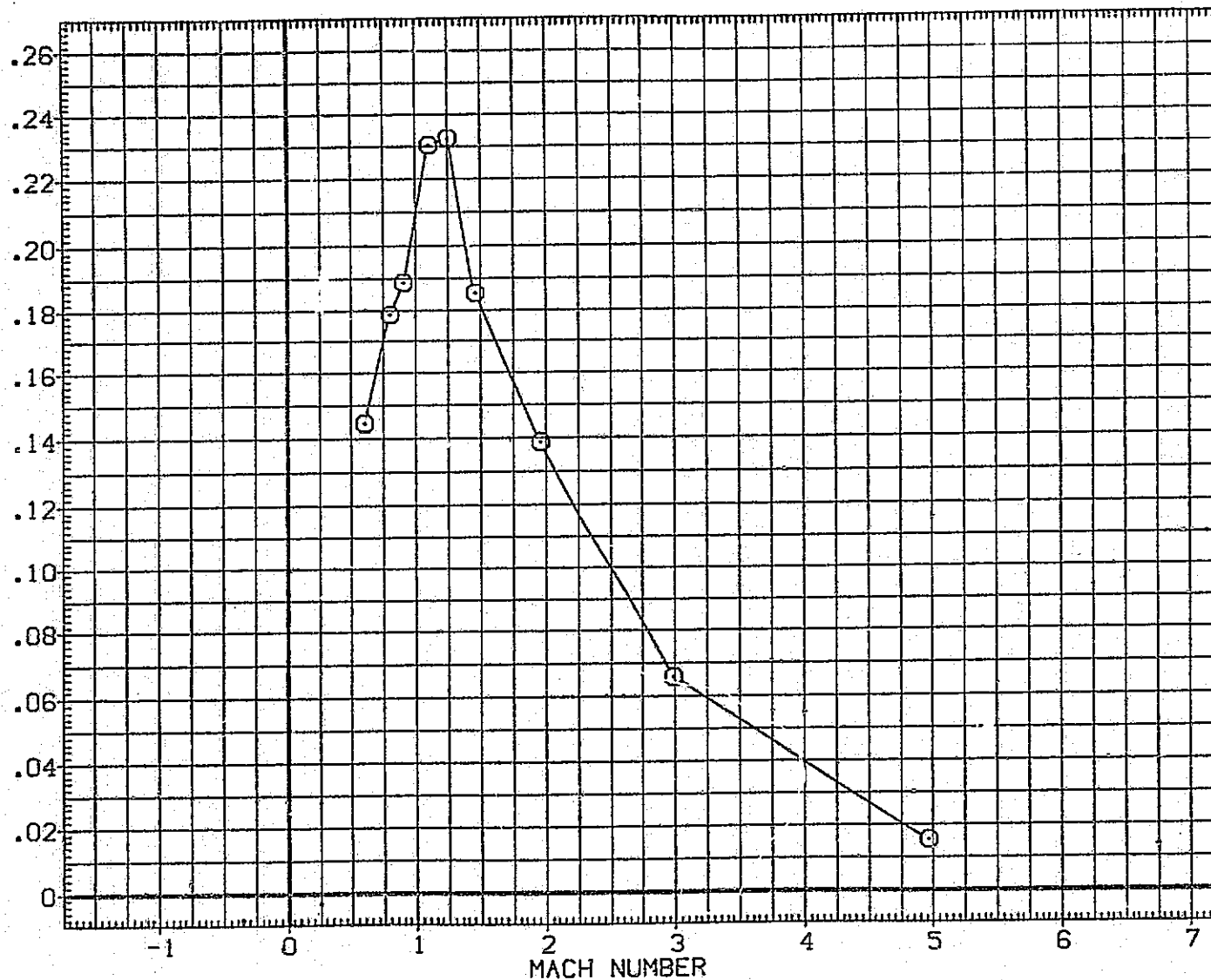


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (E) ALPHA = -2.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) O MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

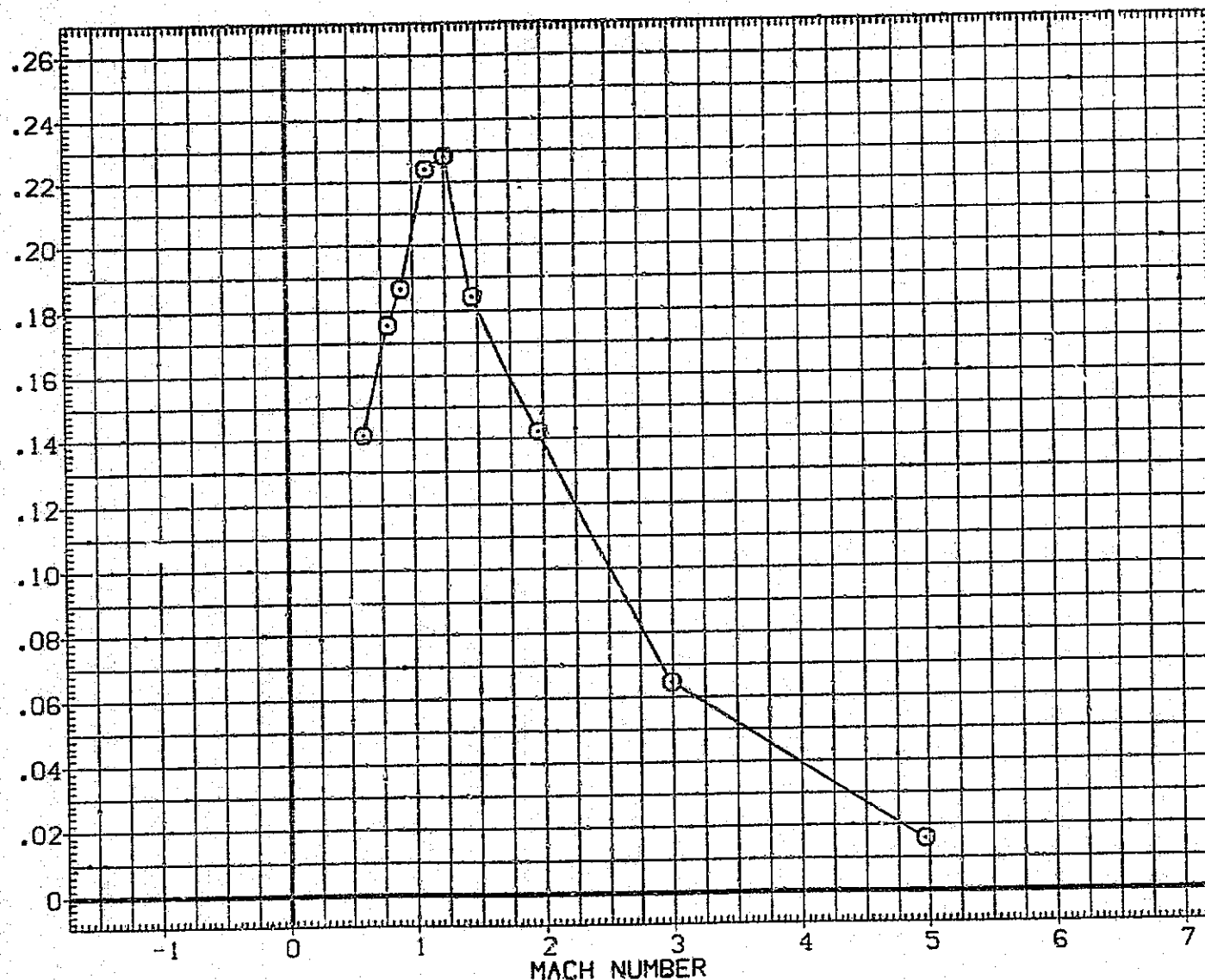


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (F)ALPHA = .00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(1A33) 740TS (TIPIS1P201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

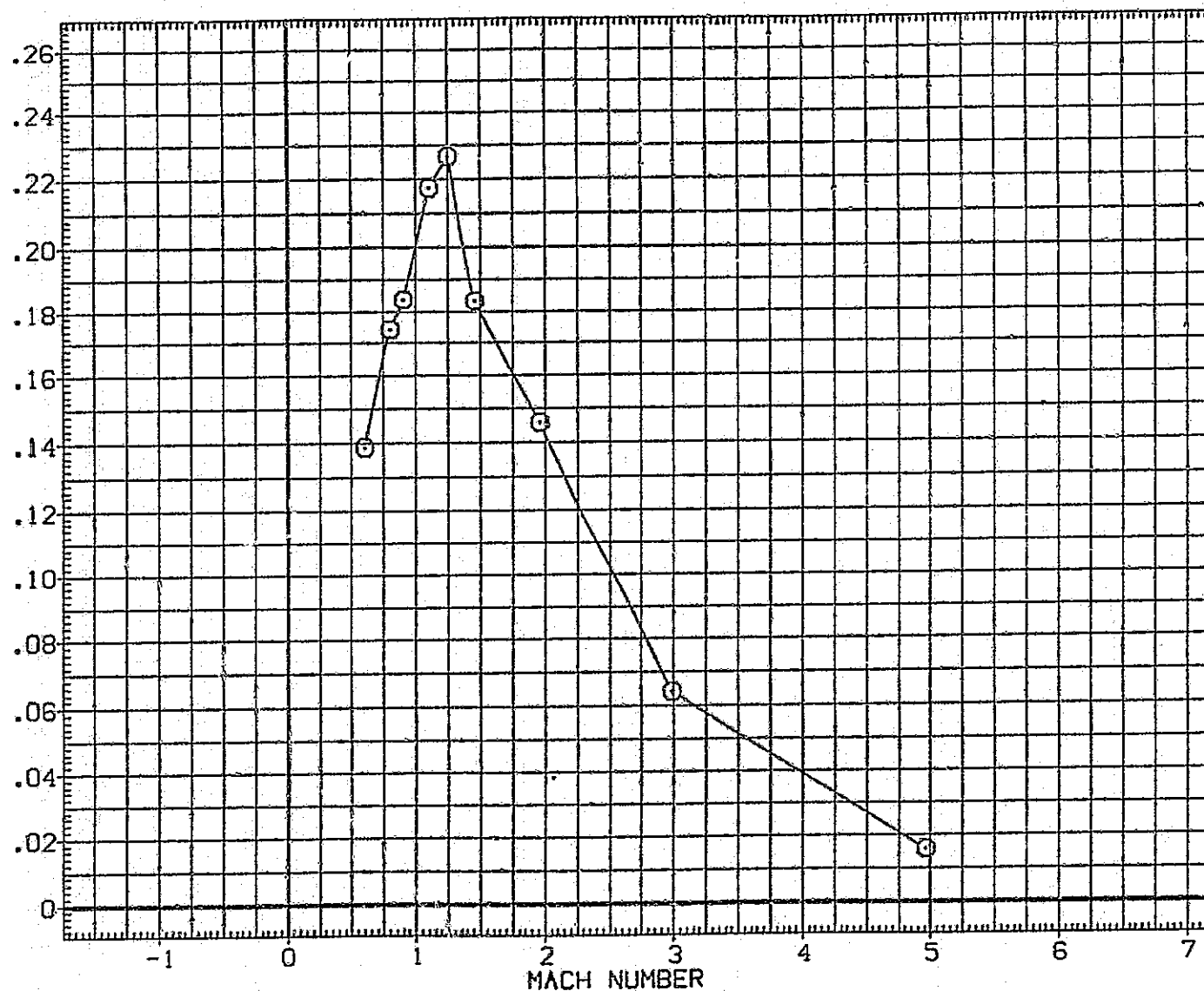


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (G) ALPHA = 2.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SG. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

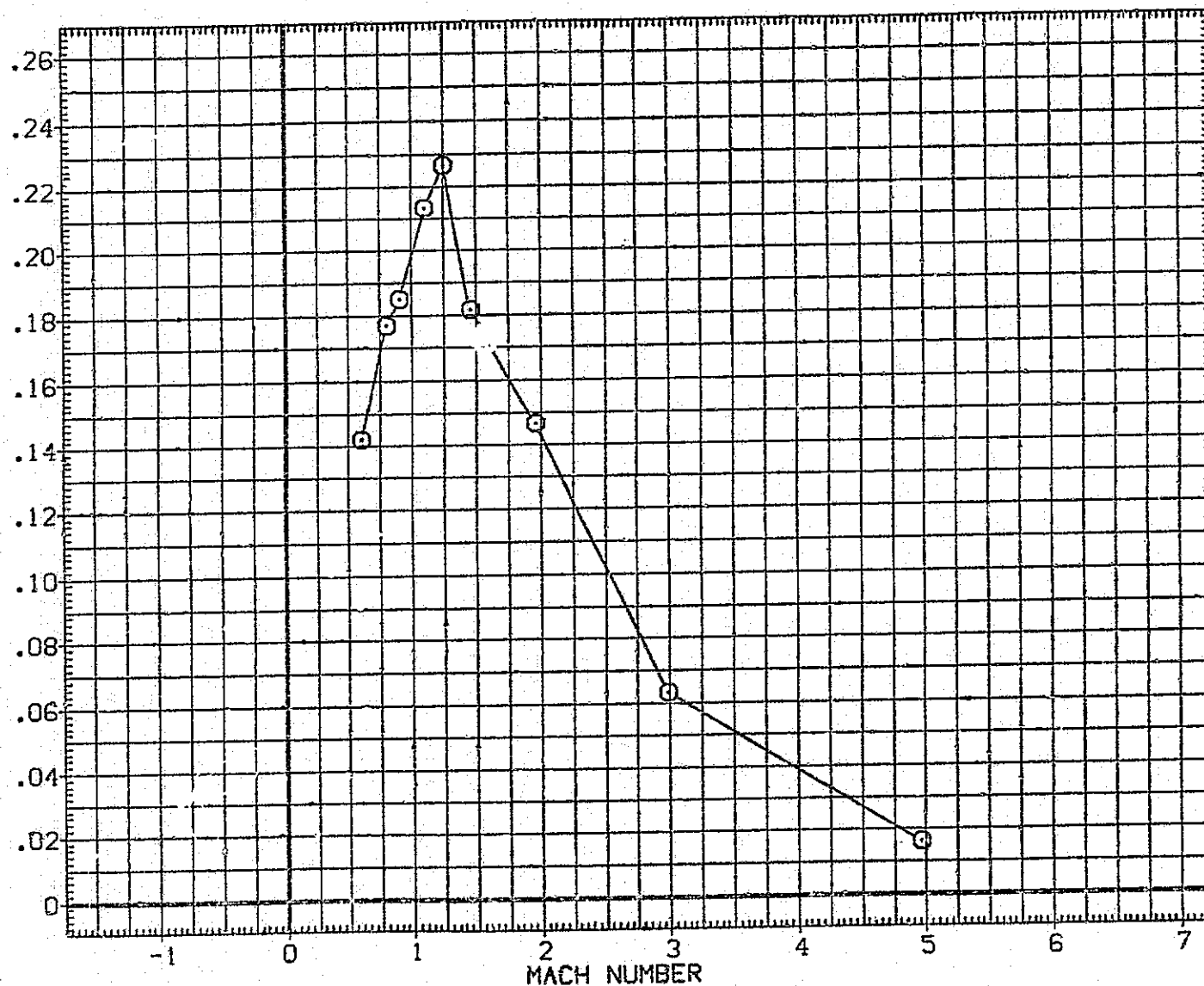


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (H) ALPHA = 4.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) O MSFC 594(1A33) 740TS (T1P1S1P201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0340

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

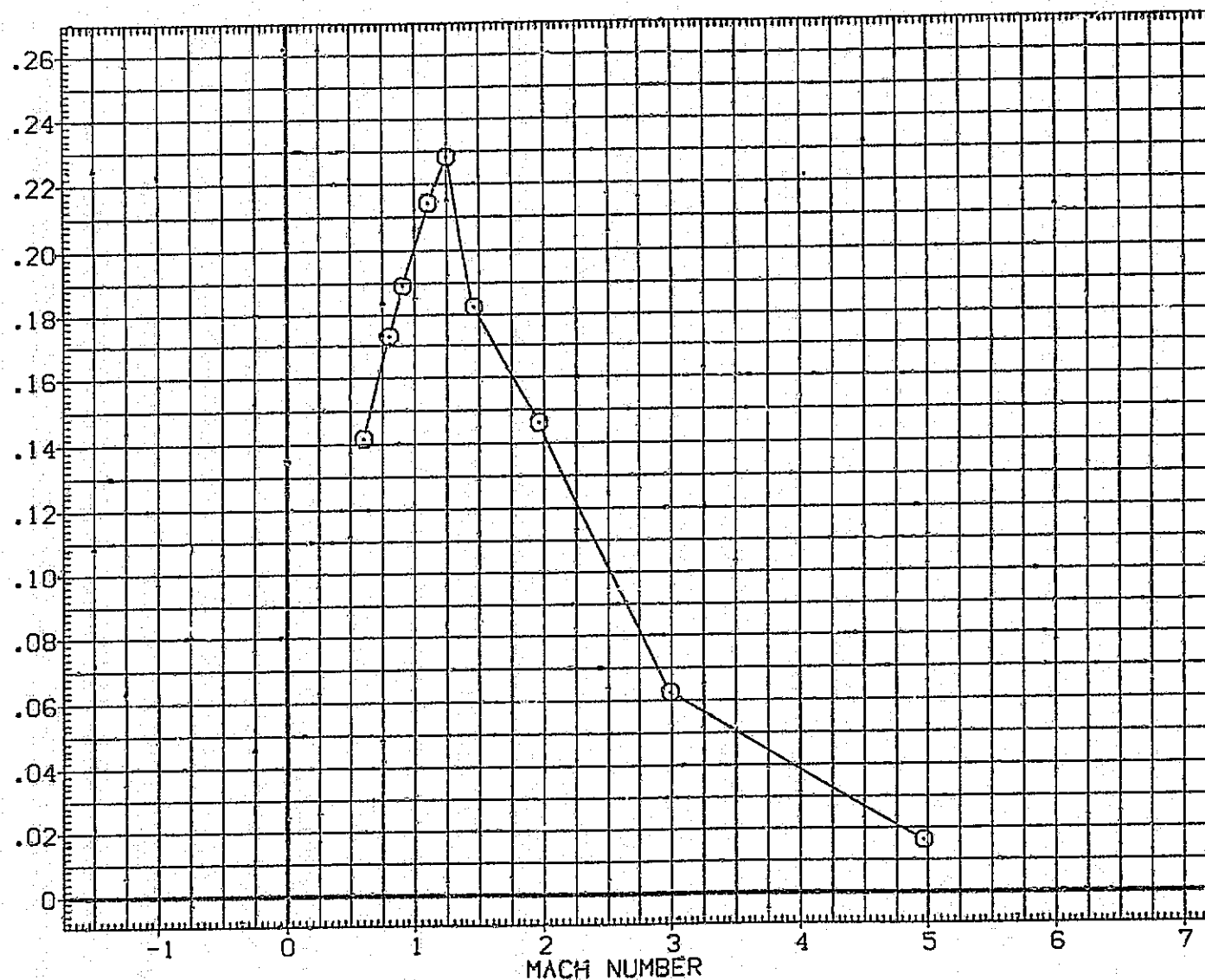


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (1) ALPHA = 6.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

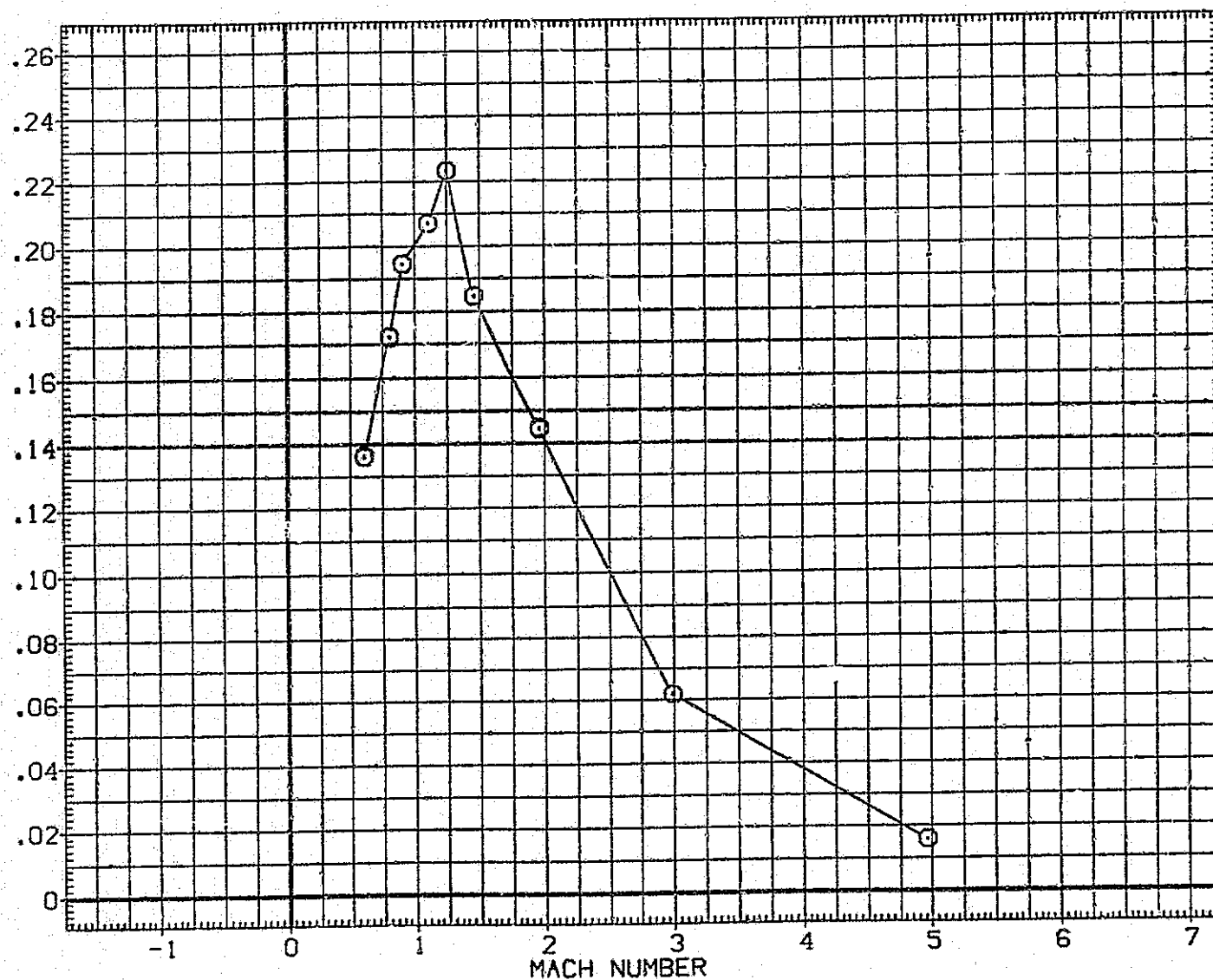


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (J) ALPHA = 8.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
(VIC007) ○ MSFC 594(1A33) 740TS (TIP1S1P231)

REFERENCE INFORMATION
SREF 2690.0000 SQ. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

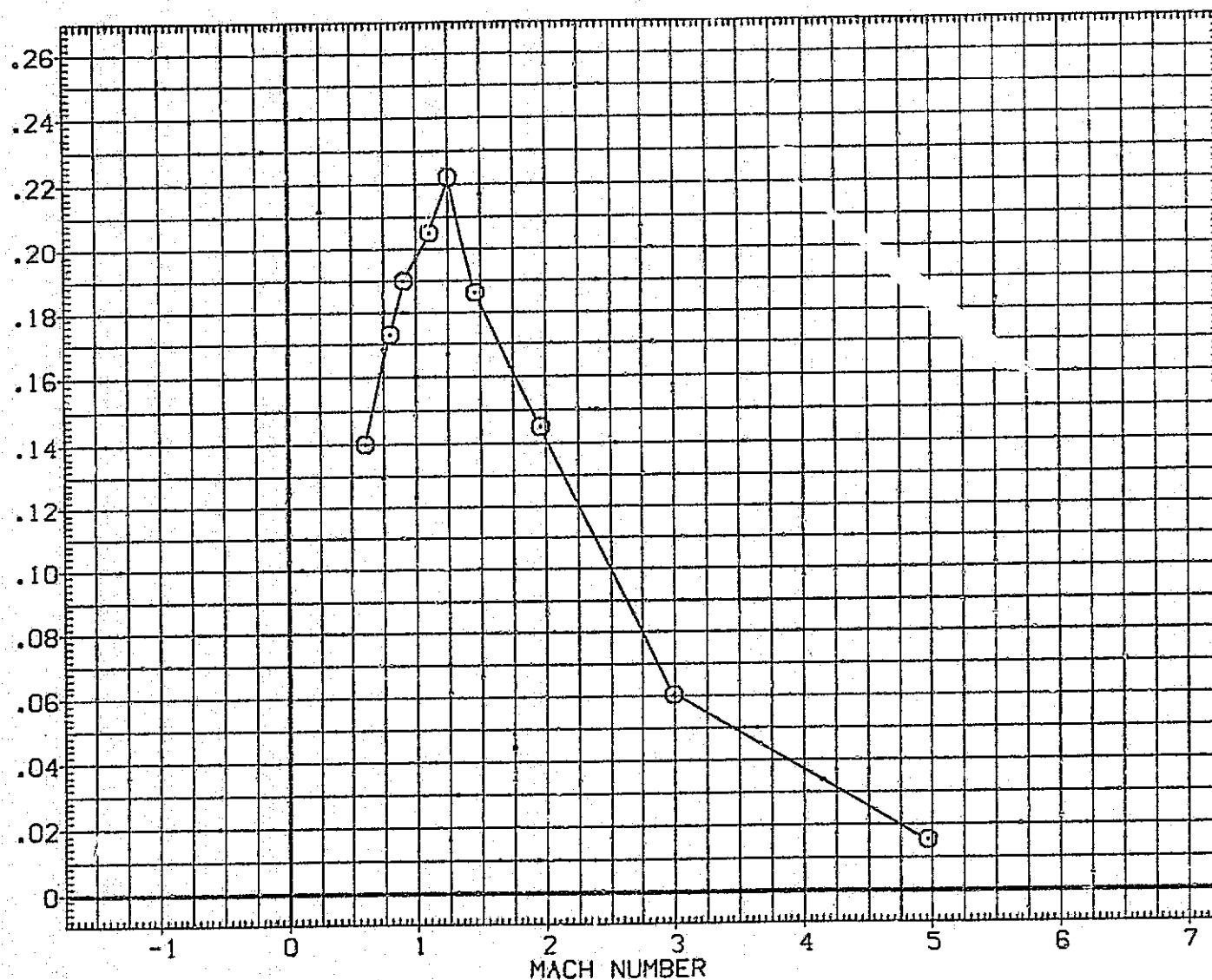


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(K) ALPHA = 10.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594 (A33) 740TS (TIPISIP201) GRB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

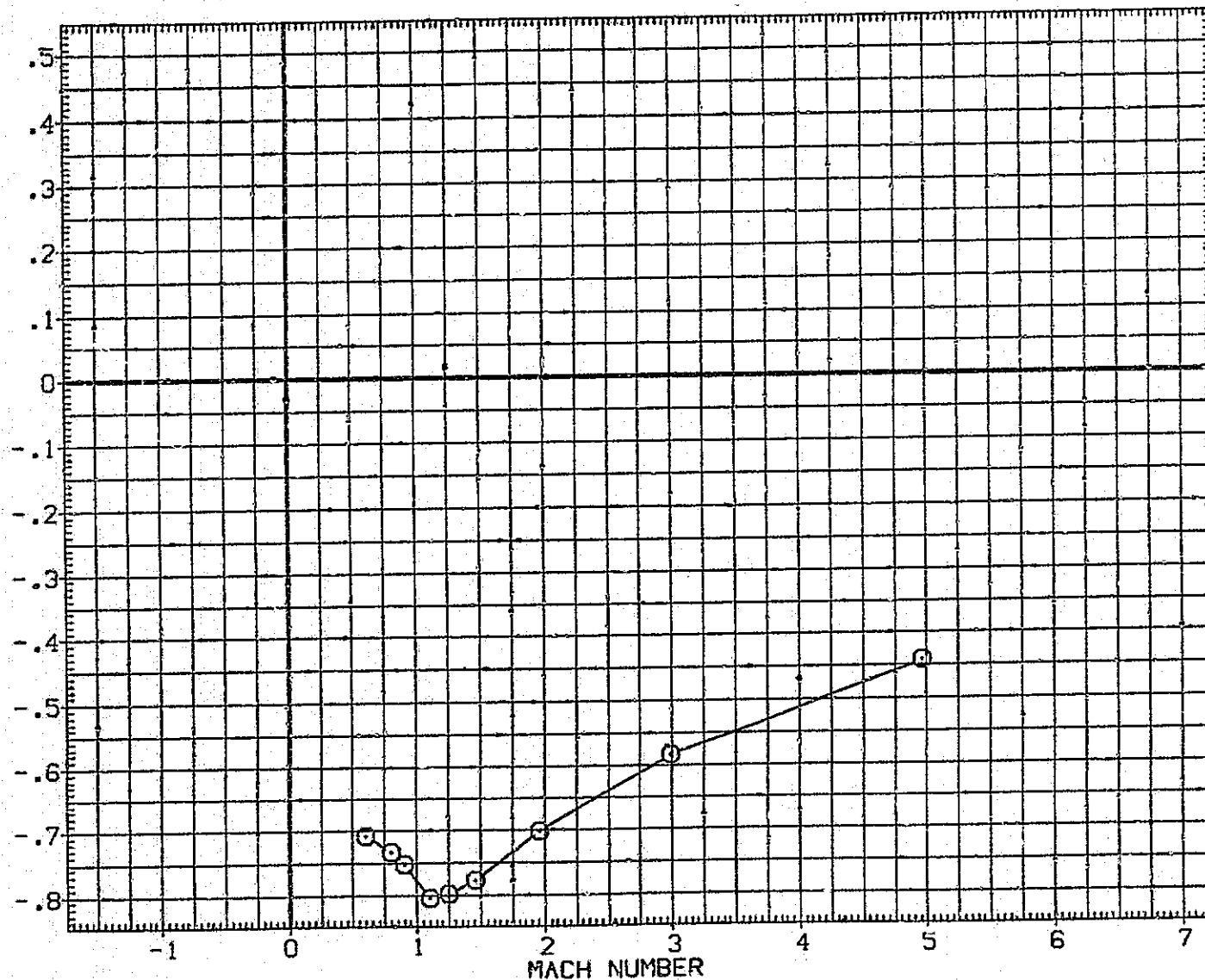


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (A) ALPHA = -10.00

NORMAL FORCE COEFFICIENT, CN

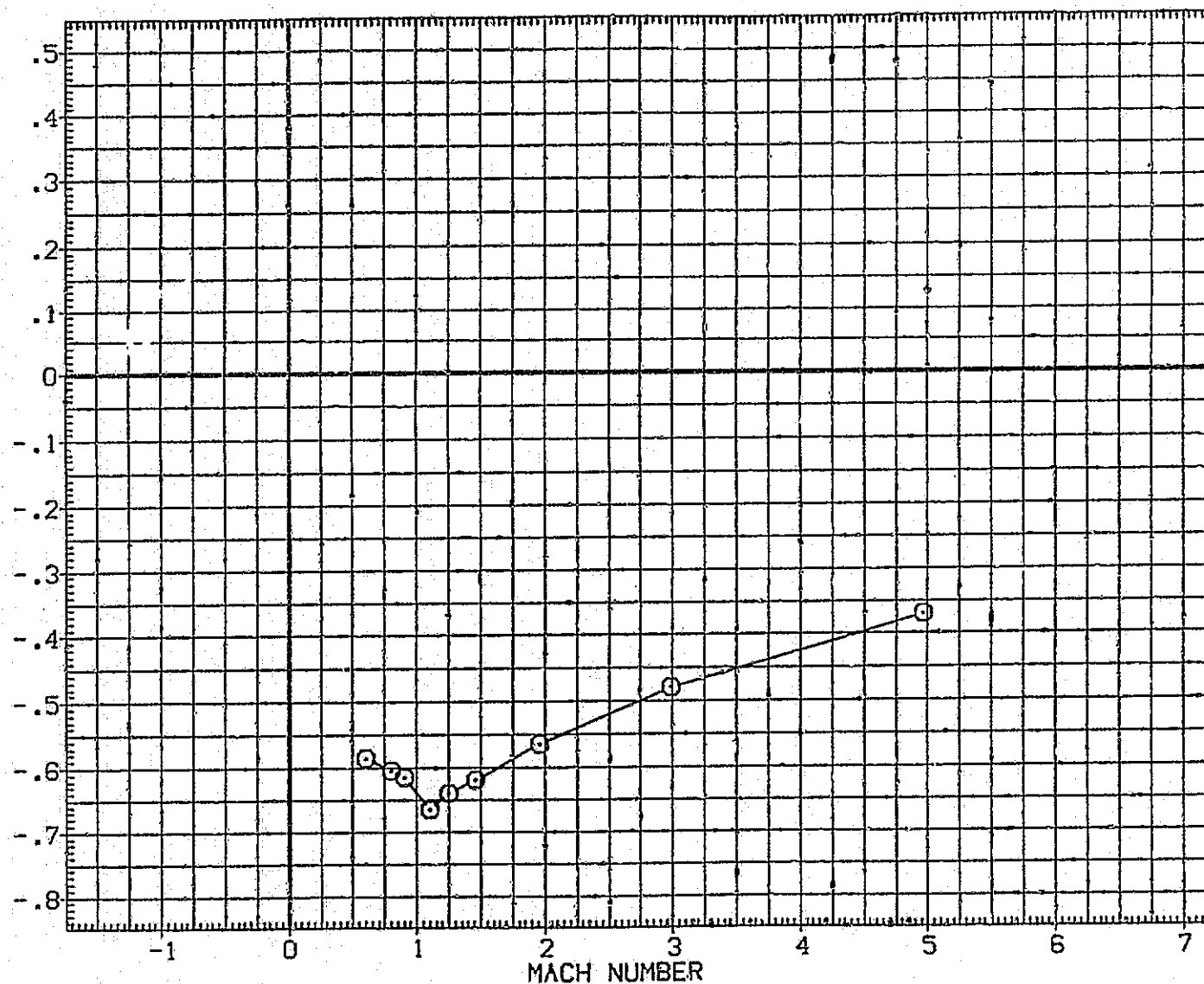


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(B) ALPHA = -8.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORG STING
 (VIC007) ○ MSFC 594(1A33) 7407S (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0010

NORMAL FORCE COEFFICIENT, CN

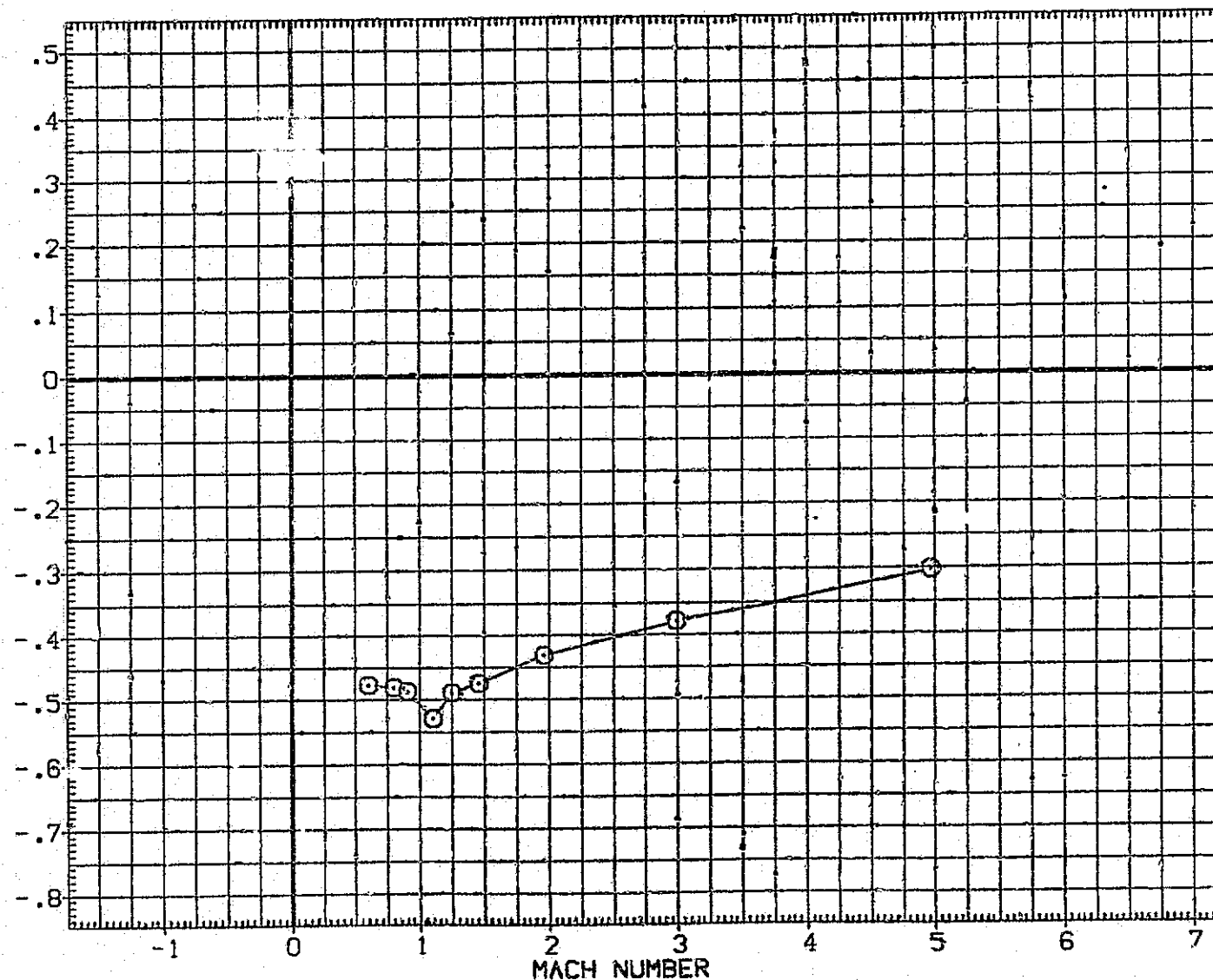


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (C) ALPHA = -6.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1250.0000 IN.
 BREF 1250.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

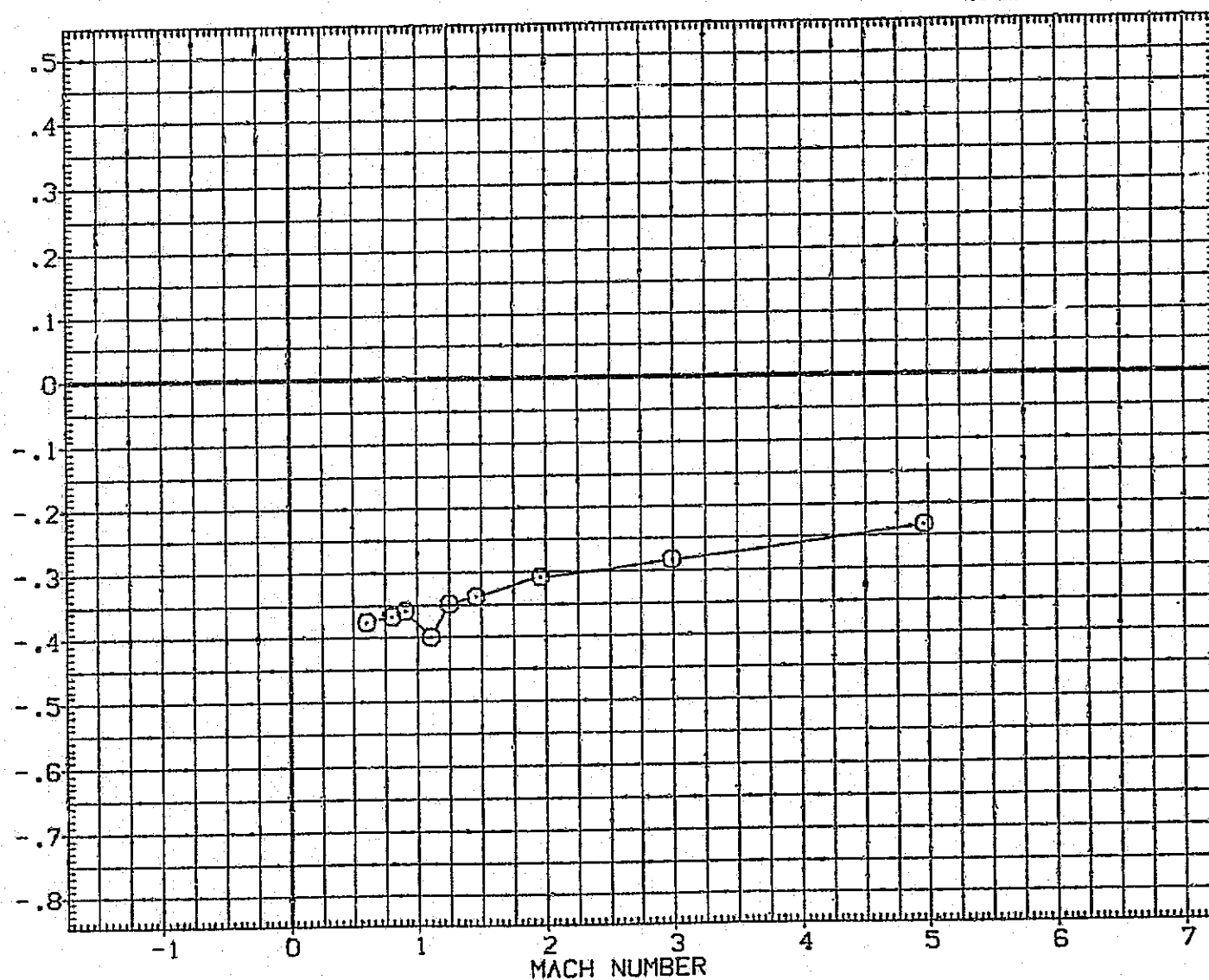


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (D) ALPHA = -4.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING -

(VIC007) ○ MSFC 594 (A33) 740TS (TIPISIP201)

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

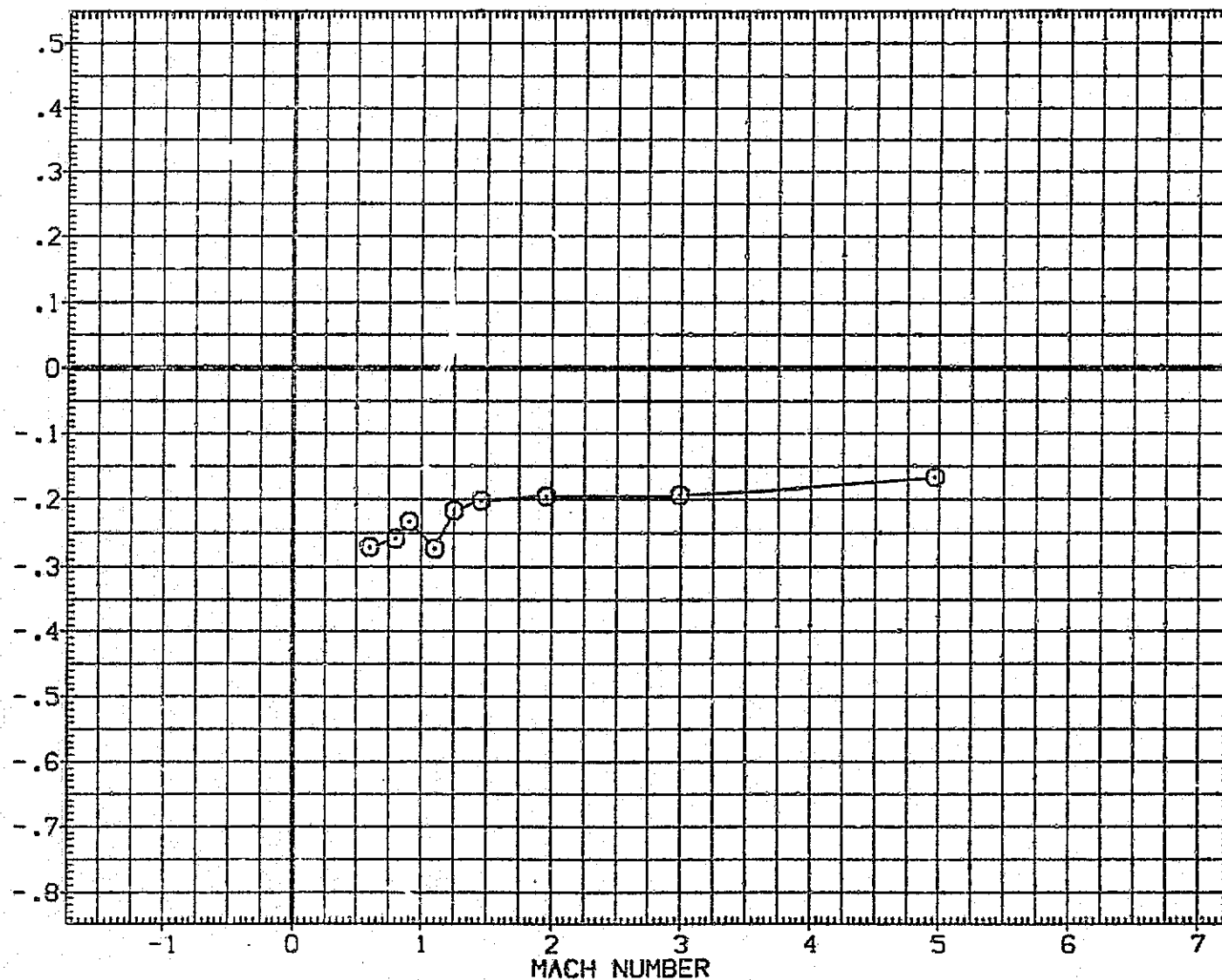


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(E) ALPHA = -2.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORG STING
(VIC007) O MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
SREF 2690.0000 SQ. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0040

NORMAL FORCE COEFFICIENT, CN

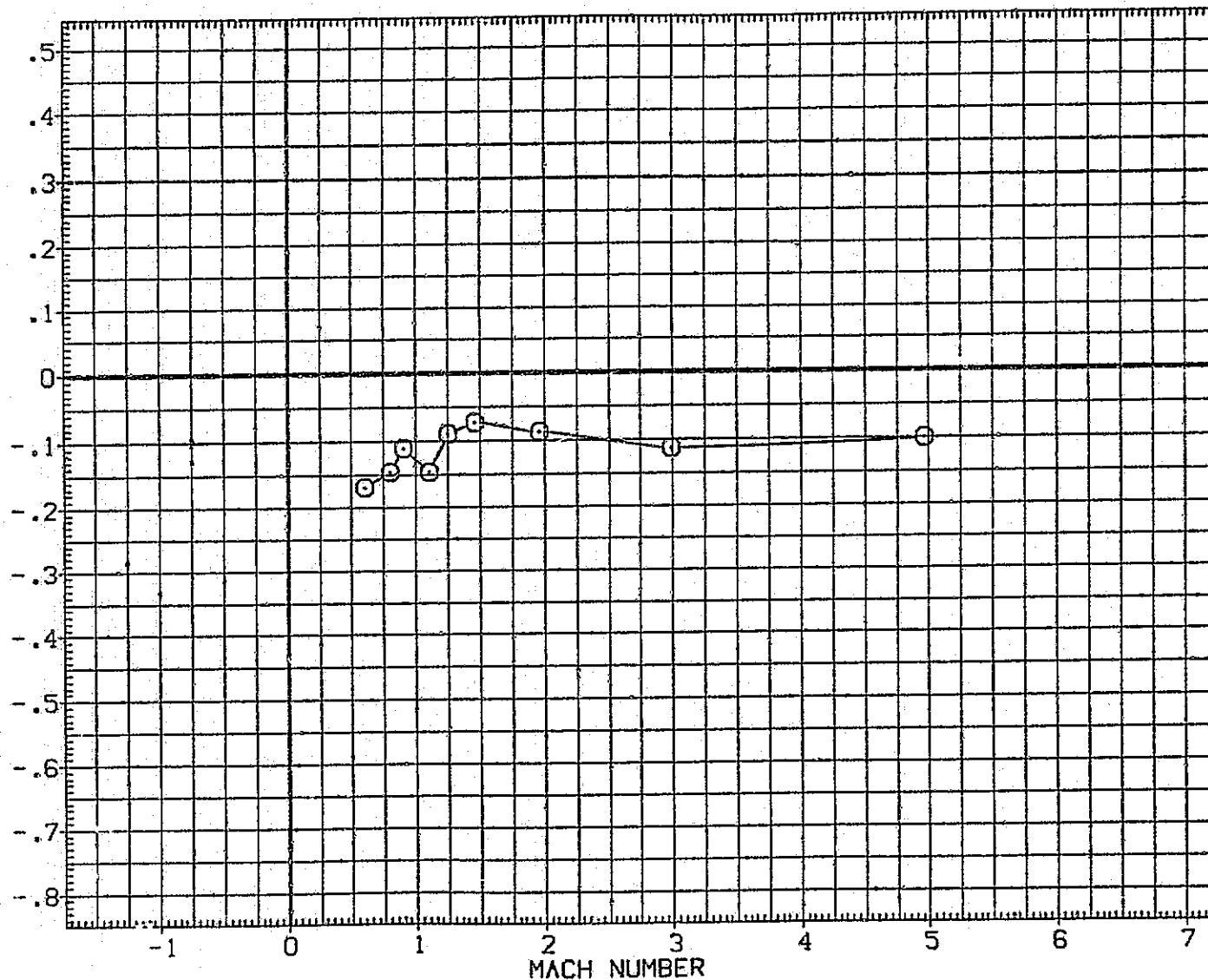


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(F) ALPHA = .00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) () MSFC 594(1A33) 740TS (TIP1SIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0007 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

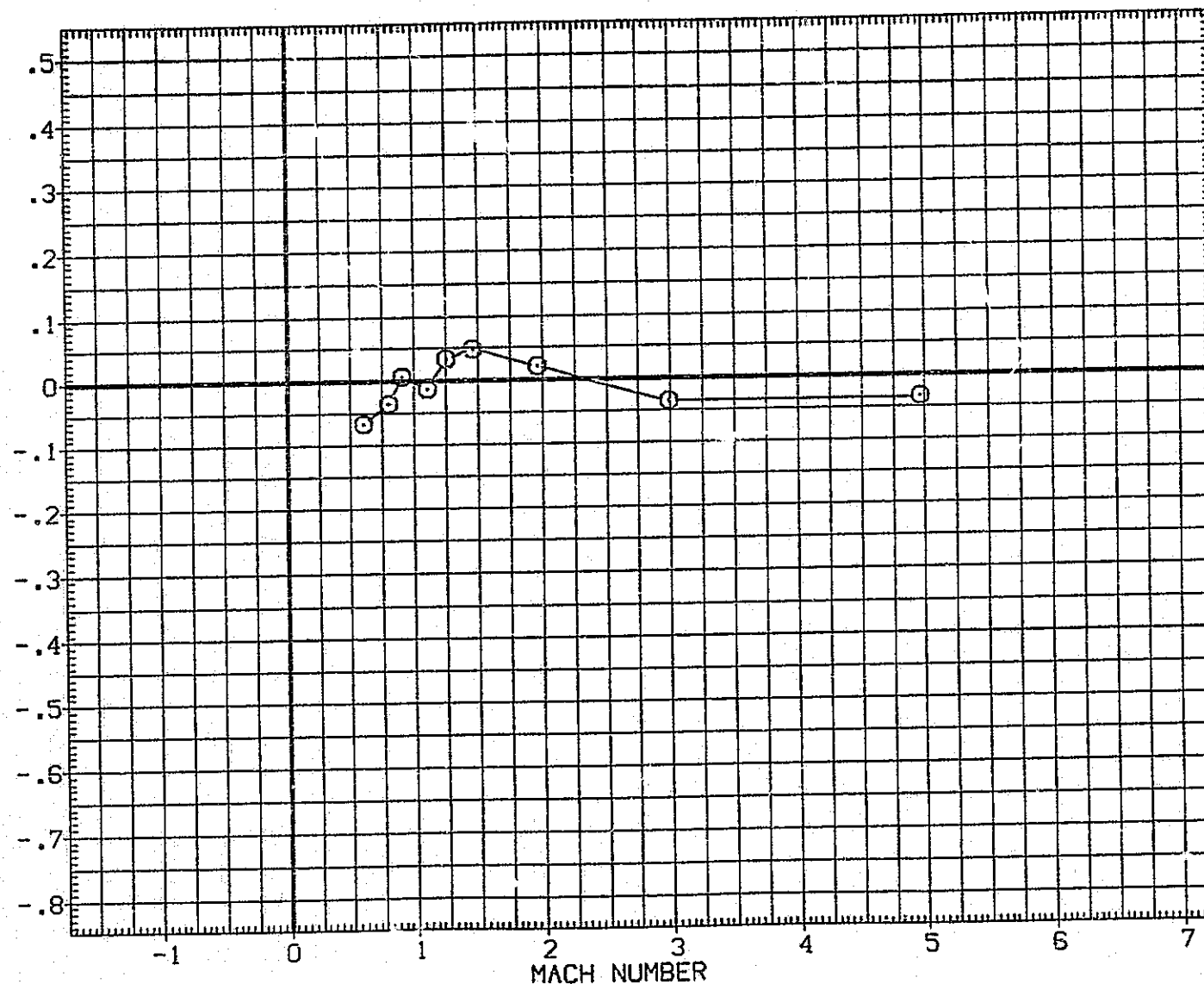


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (G) ALPHA = 2.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

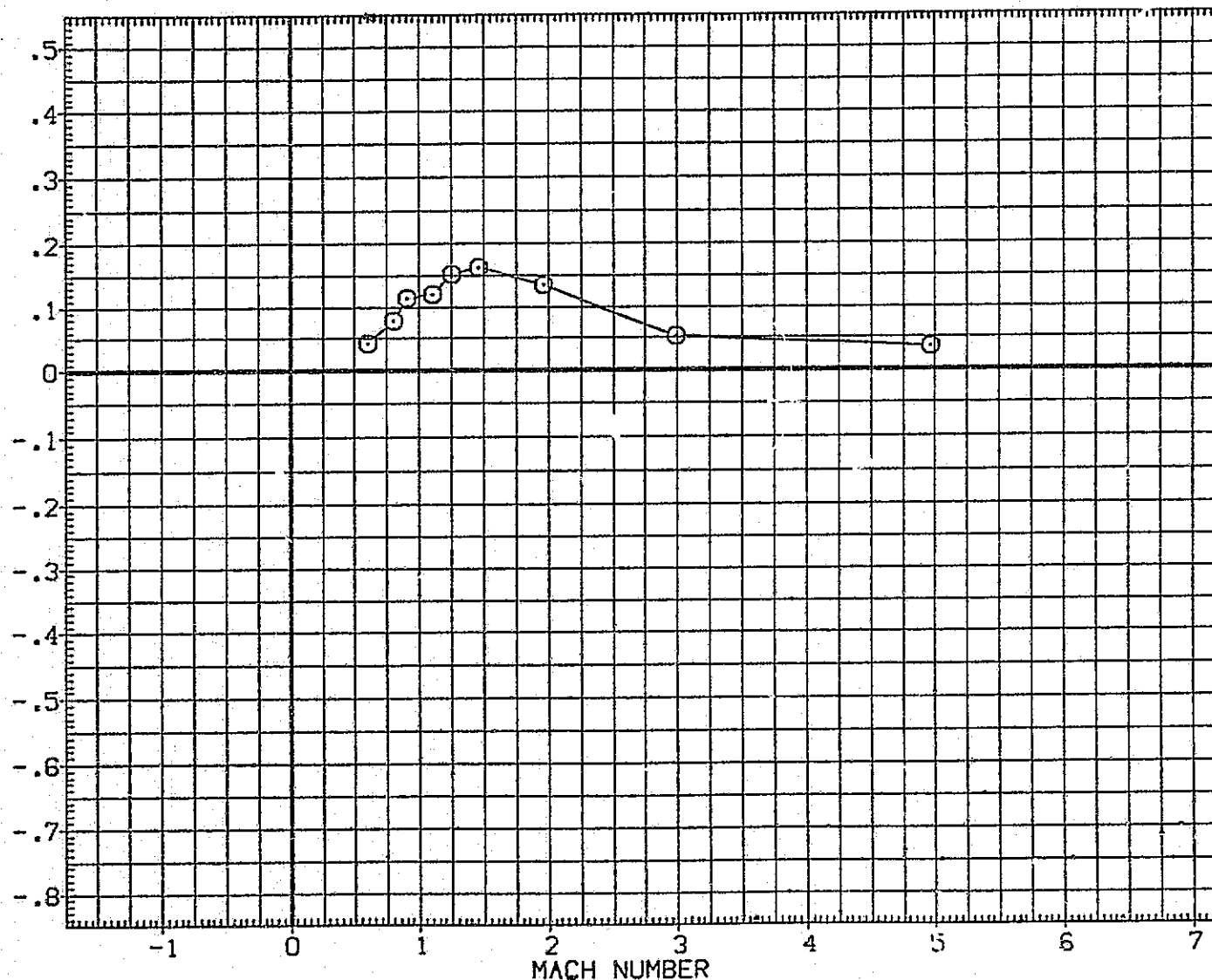


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(H) ALPHA = 4.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

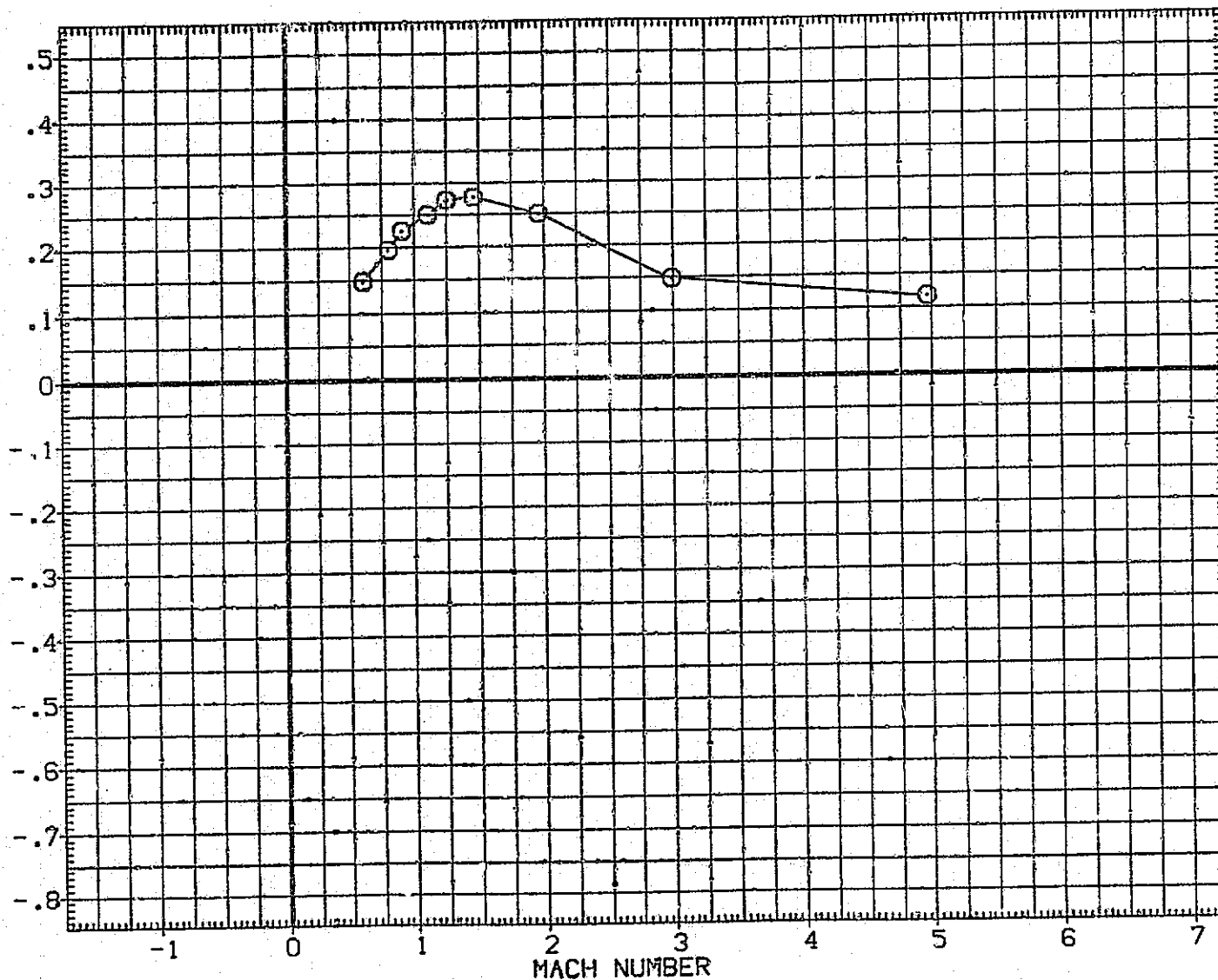


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(I) ALPHA = 6.00

NORMAL FORCE COEFFICIENT, CN

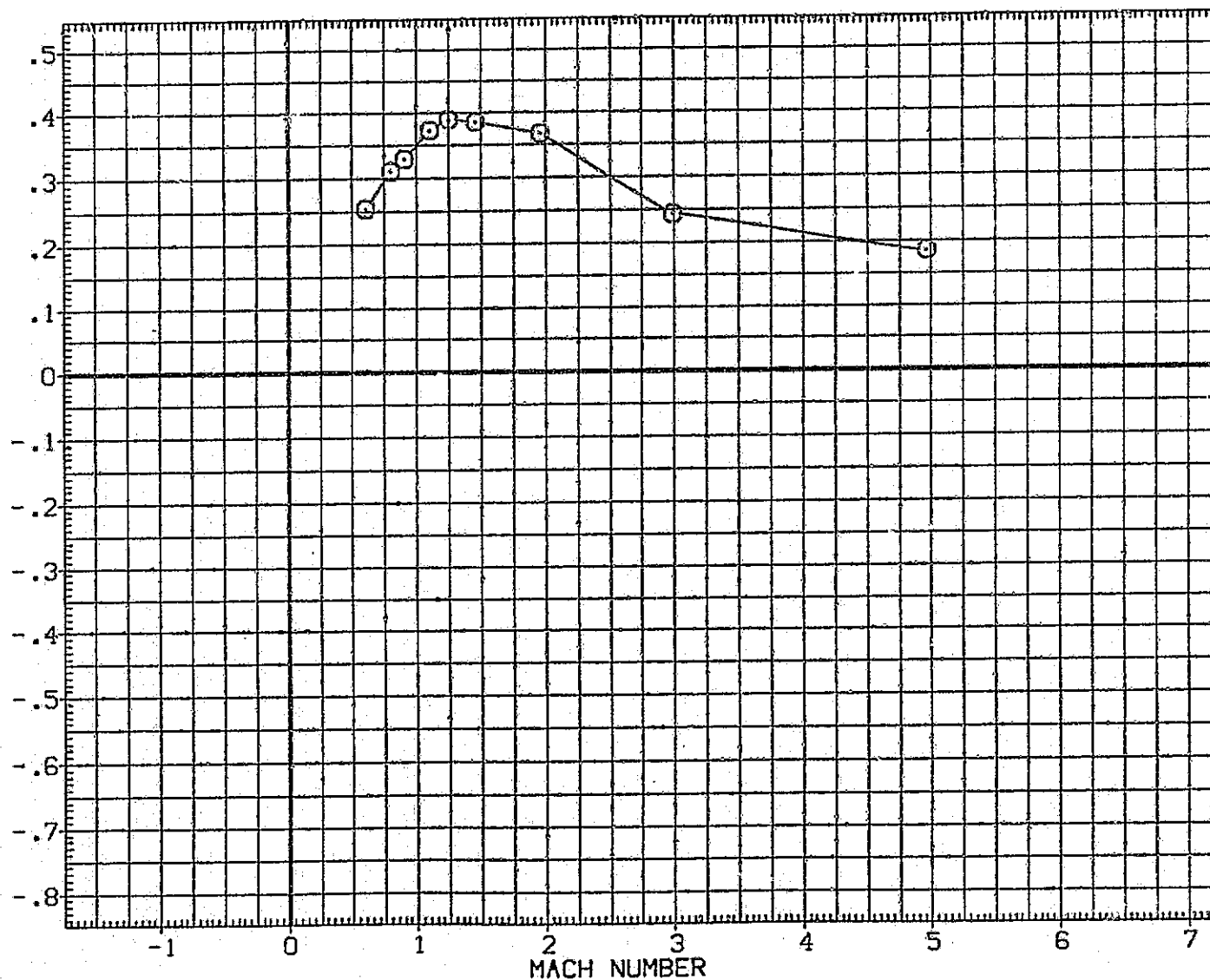


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(J)ALPHA = 8.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
(VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
SREF 2690.0000 SQ. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0040

NORMAL FORCE COEFFICIENT, CN

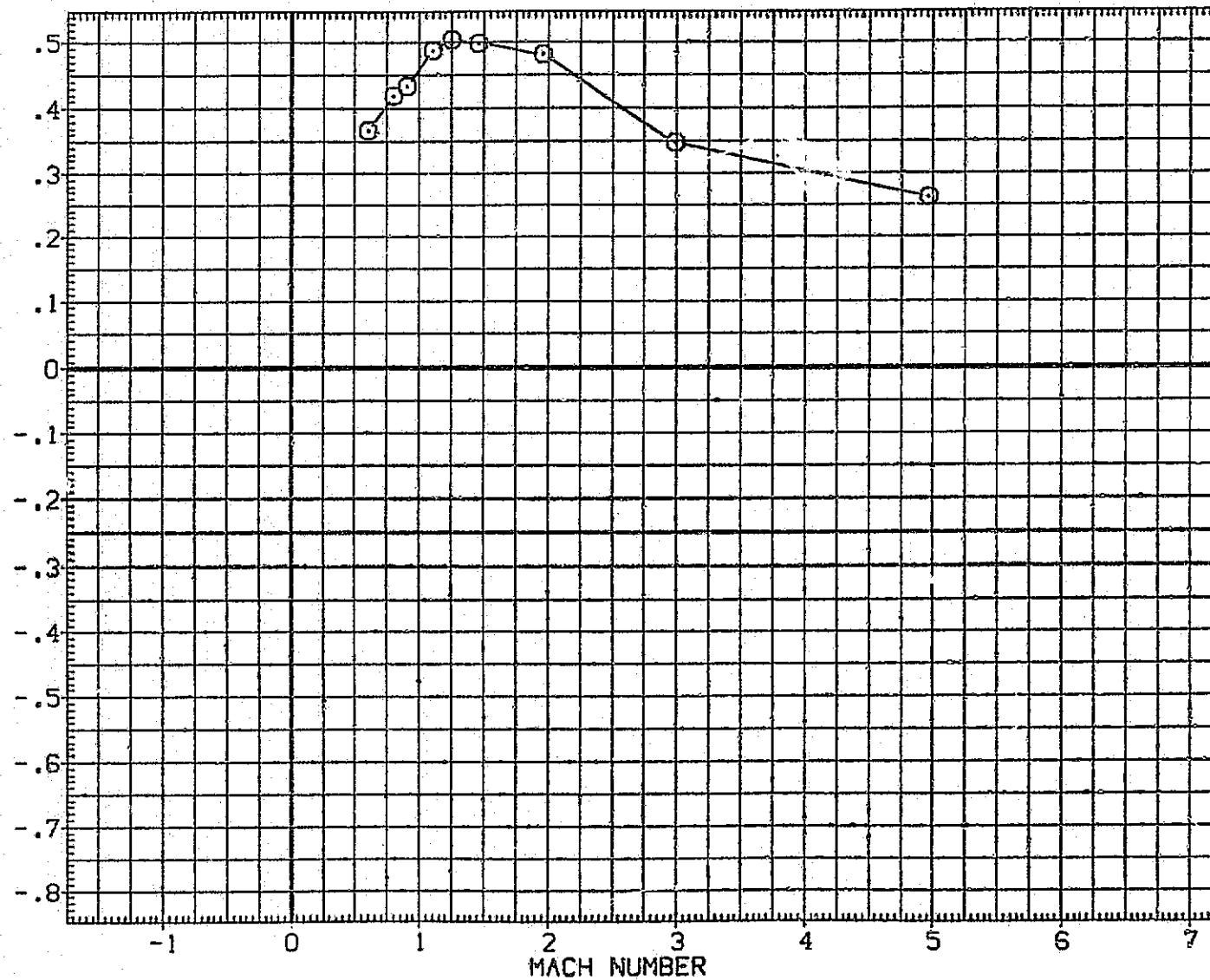


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(K) ALPHA = 10.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2650.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

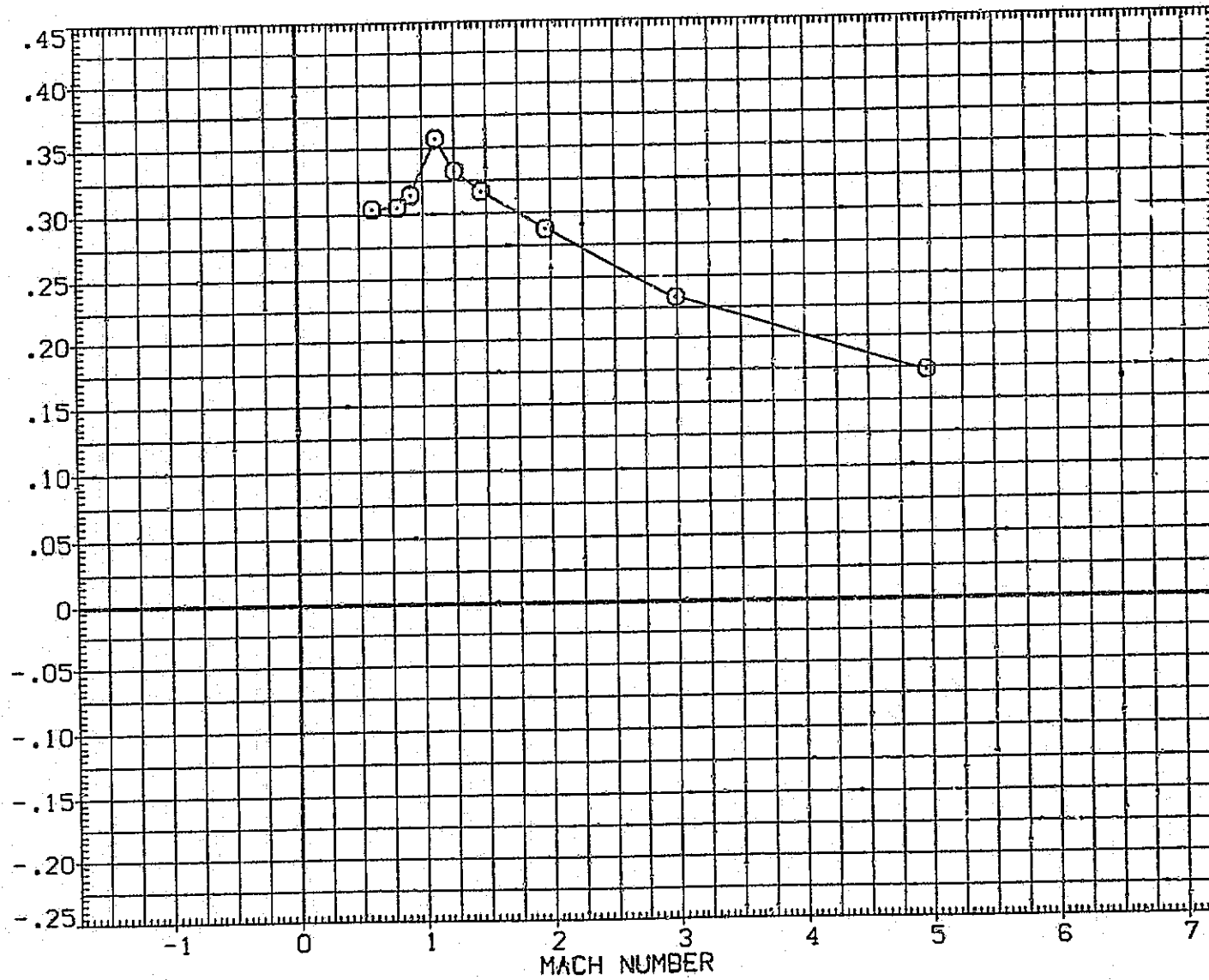


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (A) ALPHA = -10.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

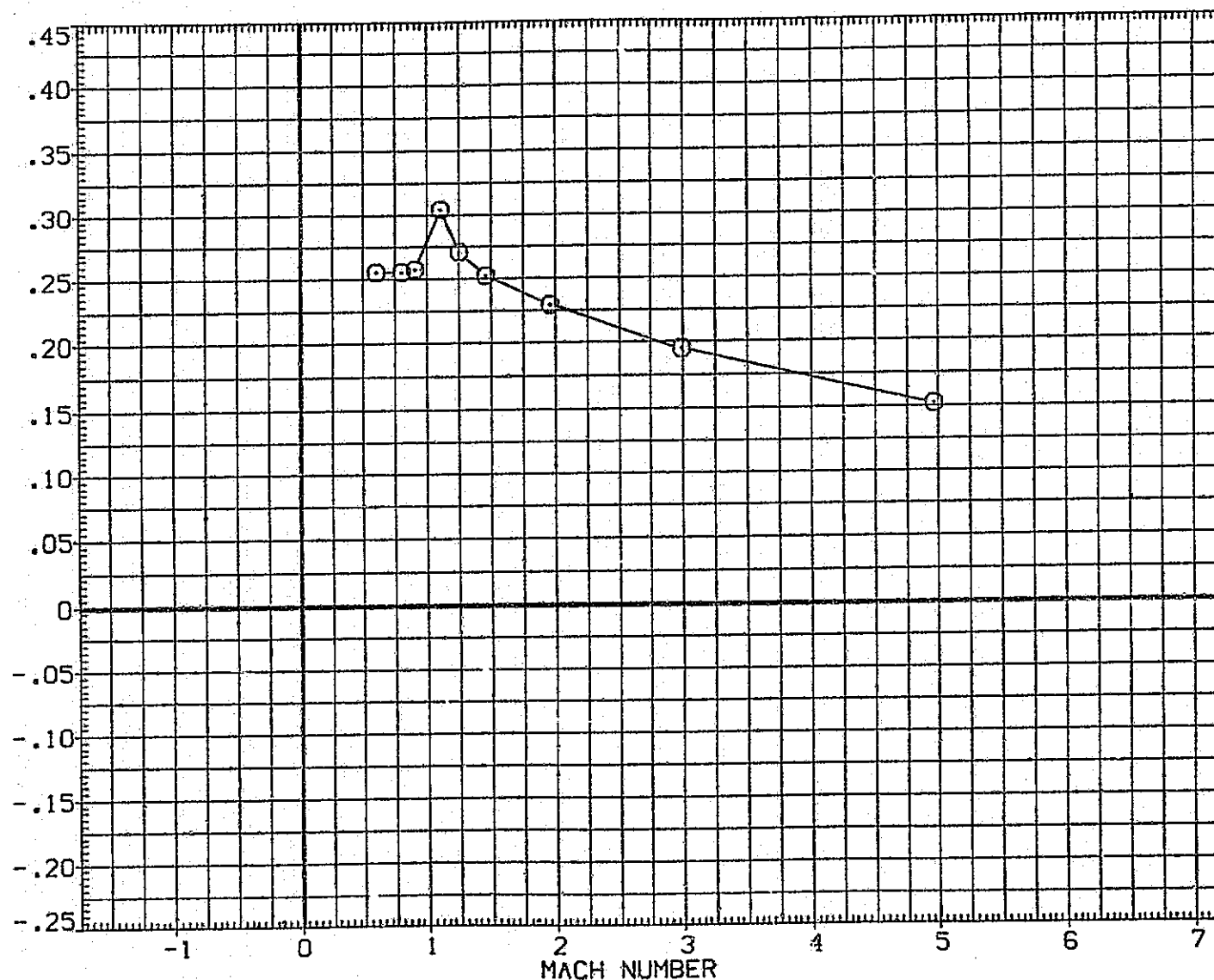


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (B) ALPHA = -8.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
(VIC007) ○ MSFC 594(1A33) 740TS (T1P1S1P201)

REFERENCE INFORMATION
SREF 2690.0000 SQ. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

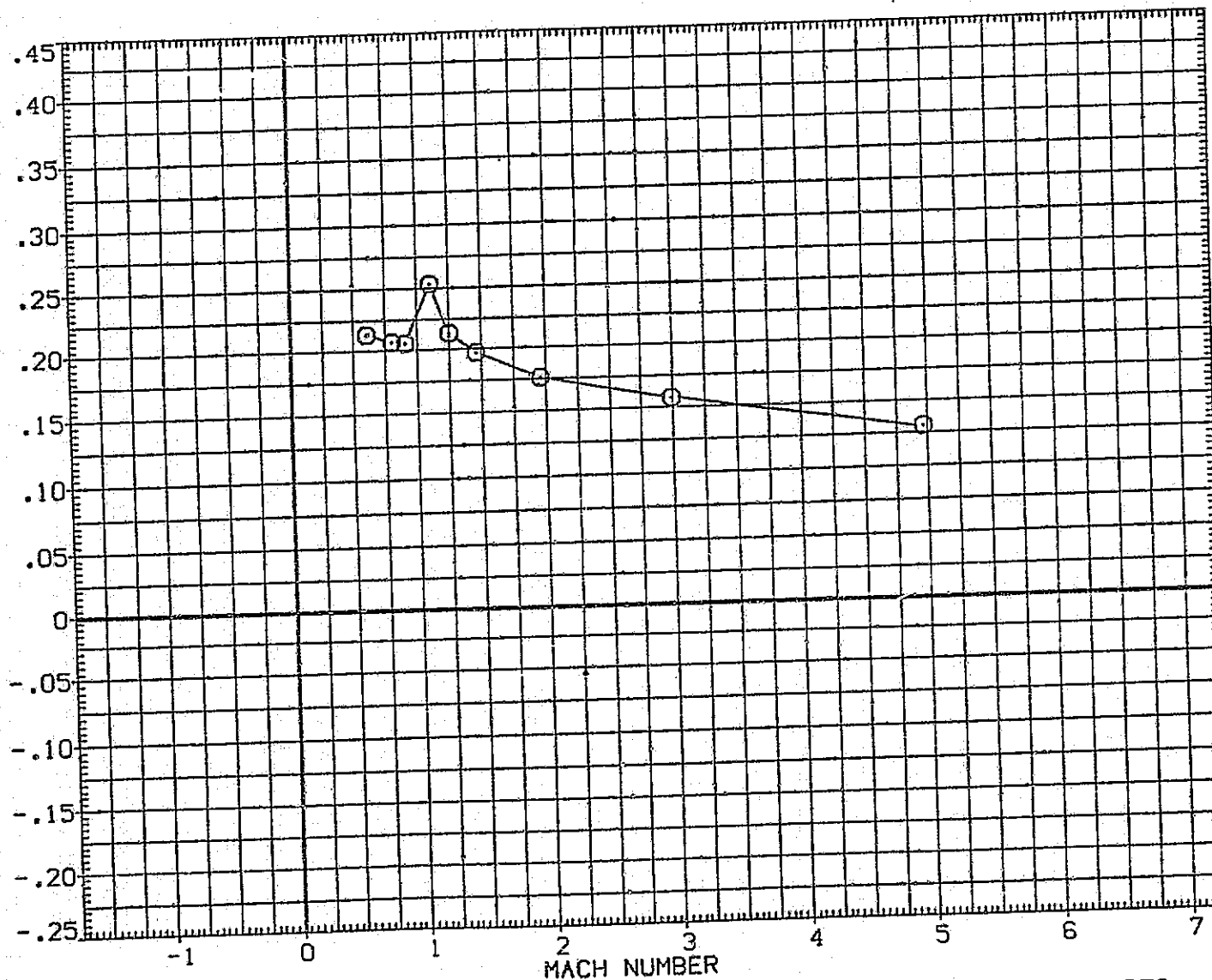


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(C) ALPHA = -6.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (TIP1SIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

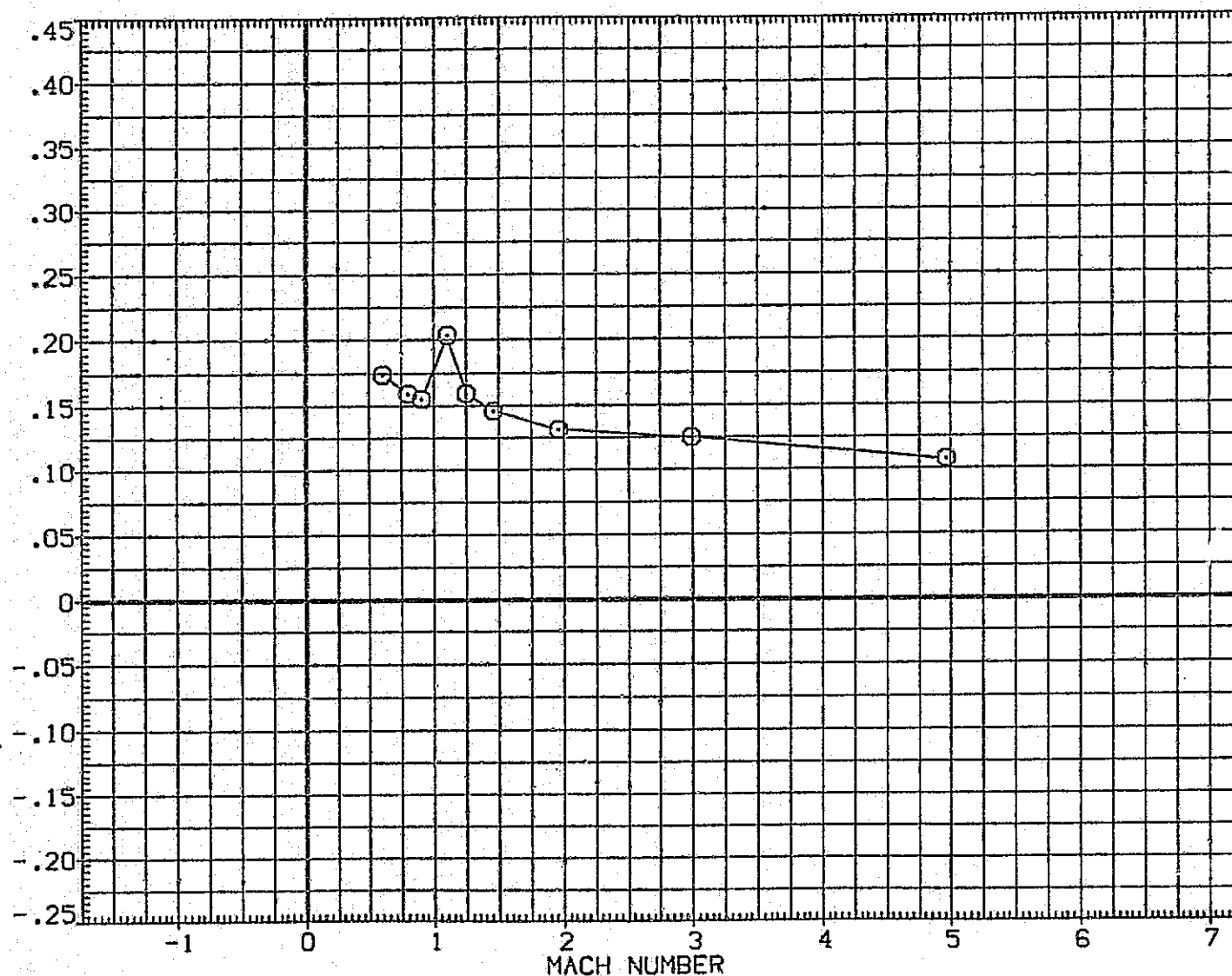


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (D) ALPHA = -4.00

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

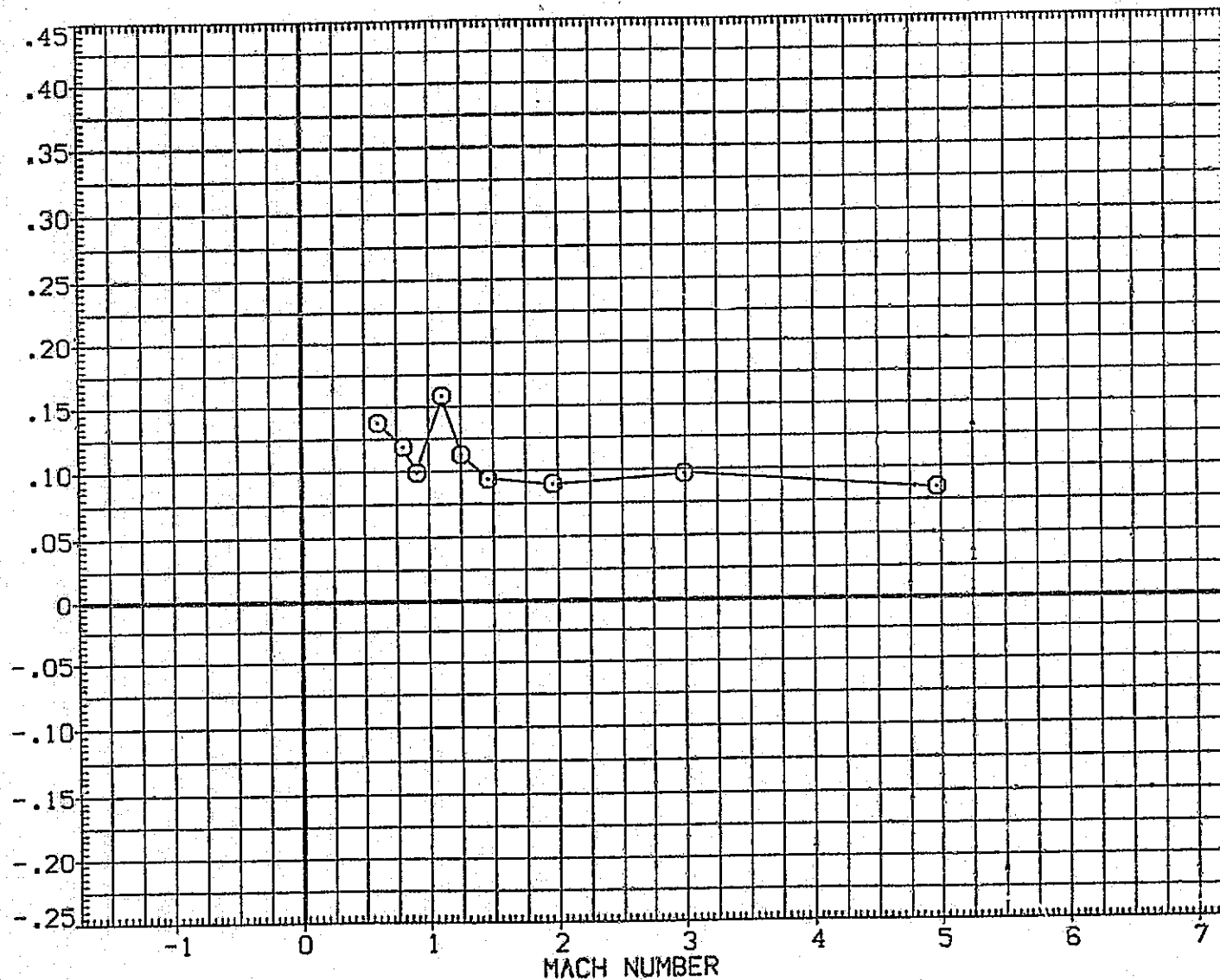


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
(E) ALPHA = -2.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (TIP1SIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

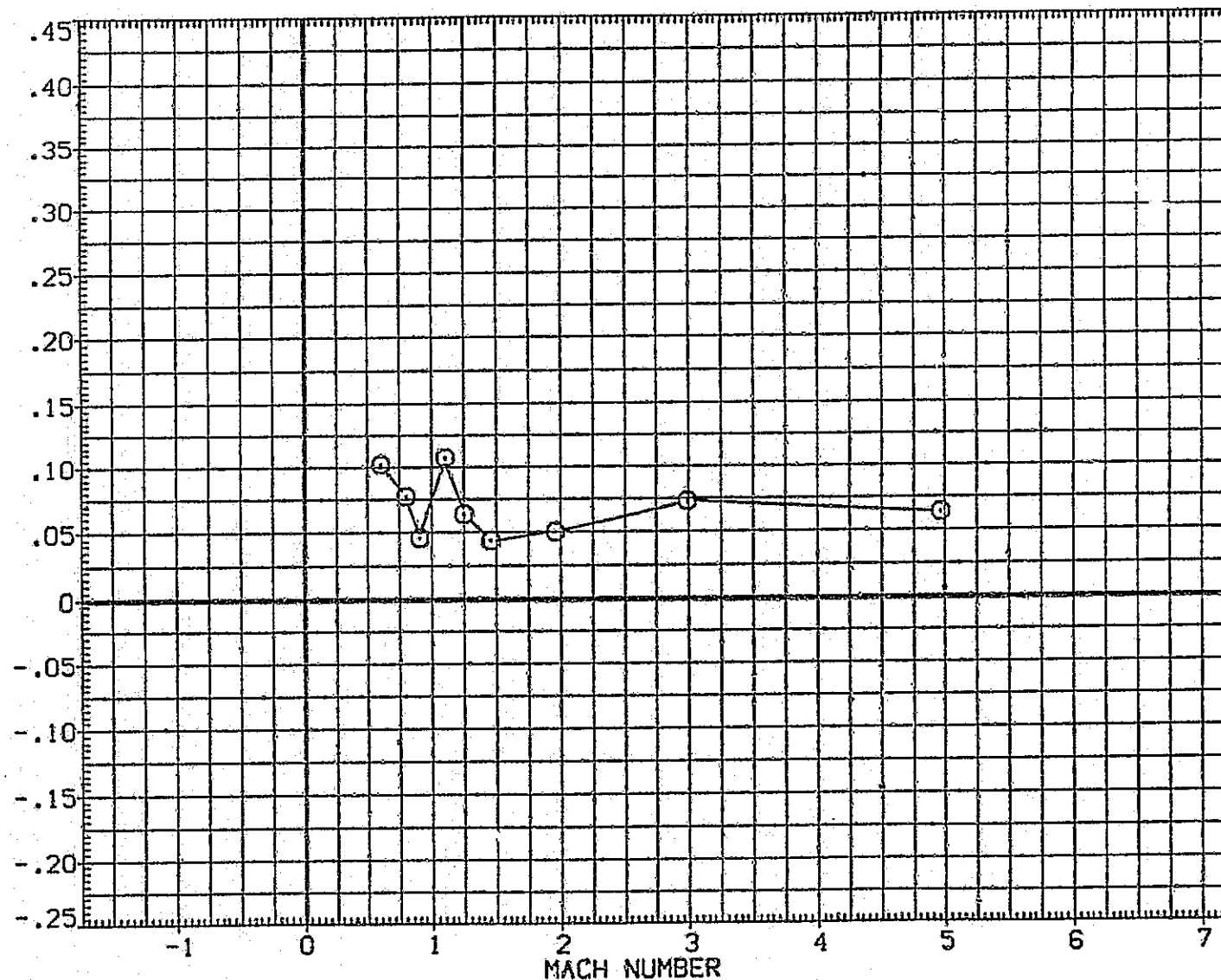


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(F) ALPHA = .00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

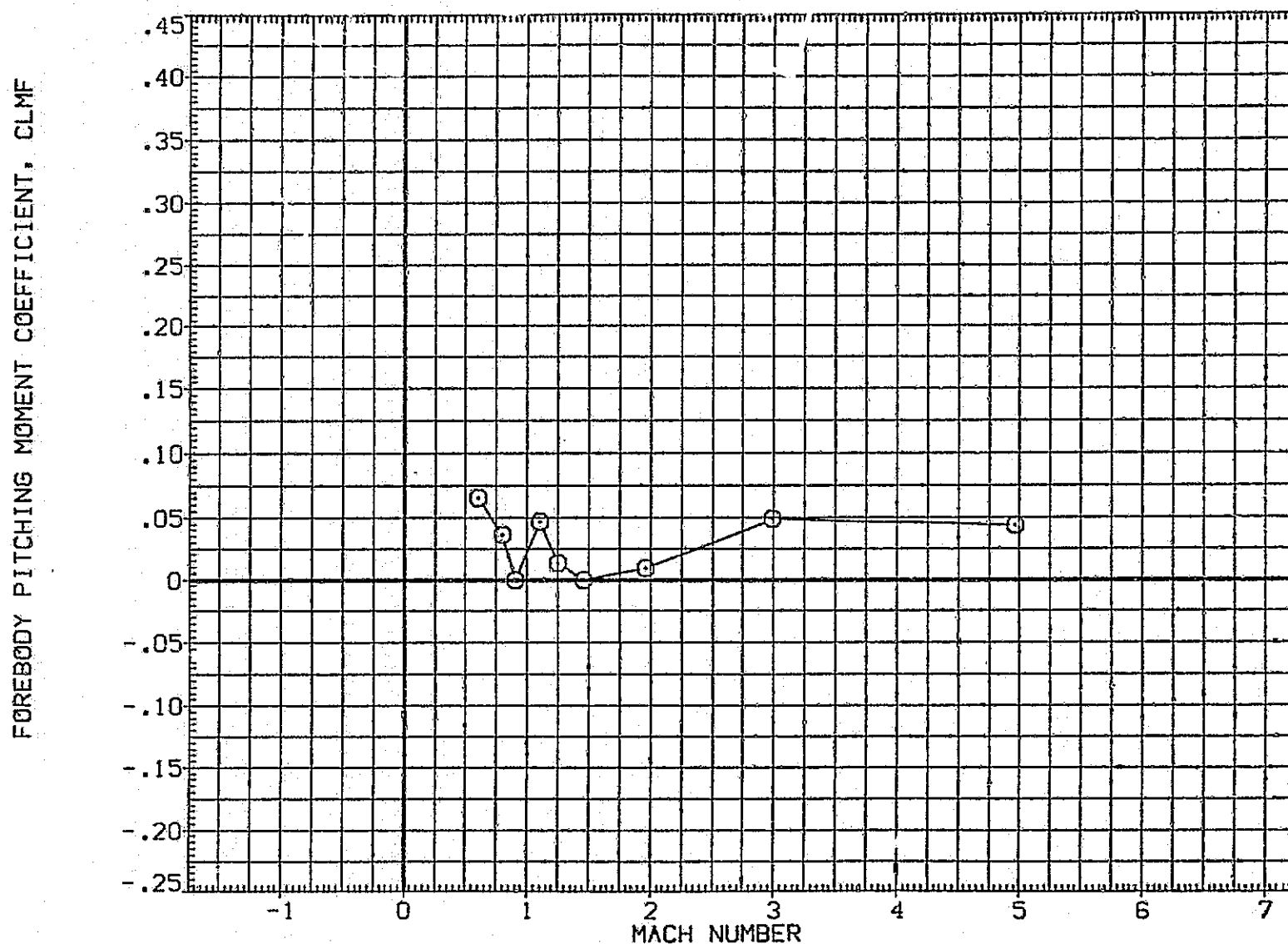


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (G) ALPHA = 2.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594 (A39) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

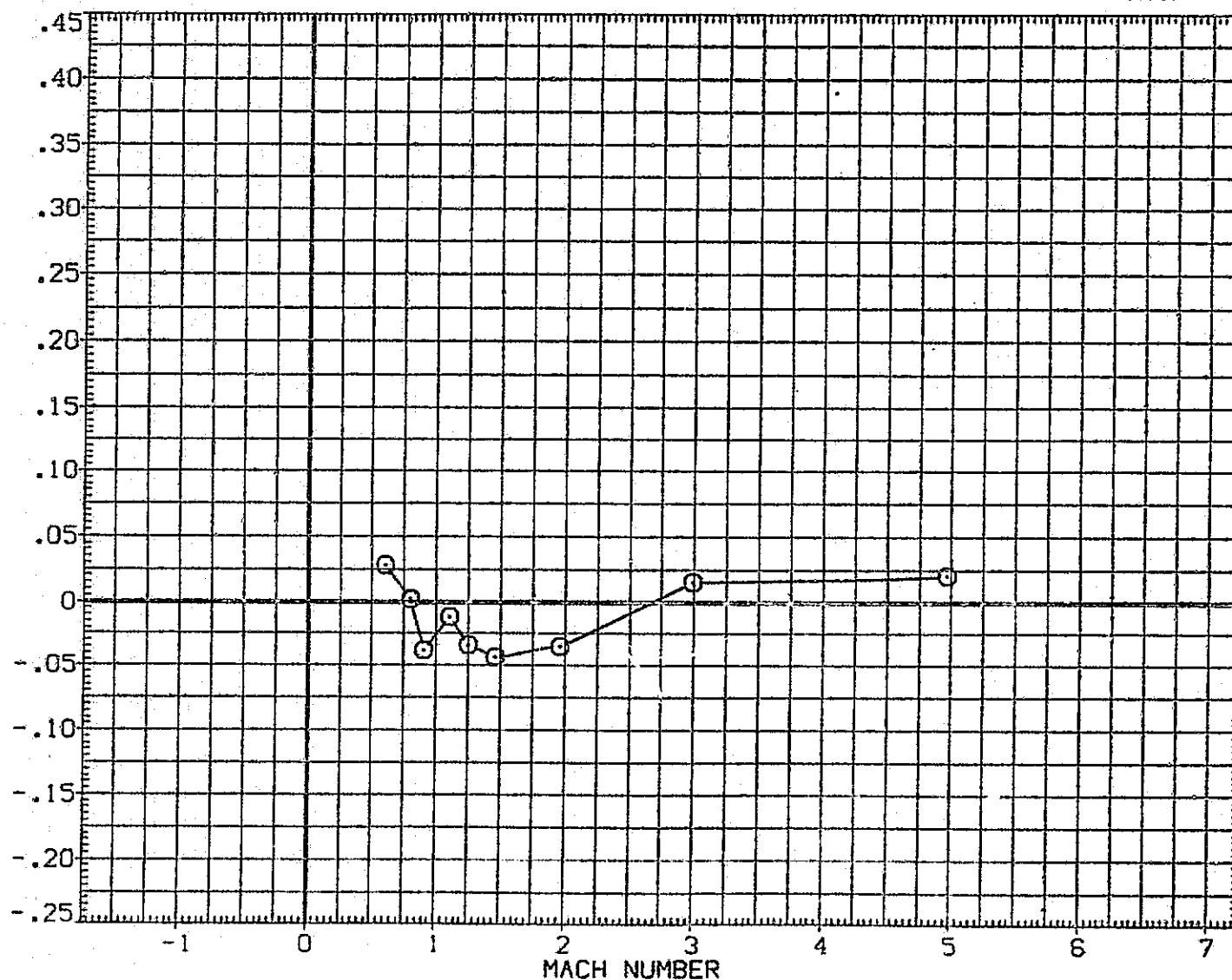


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (H) ALPHA = 4.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201)

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

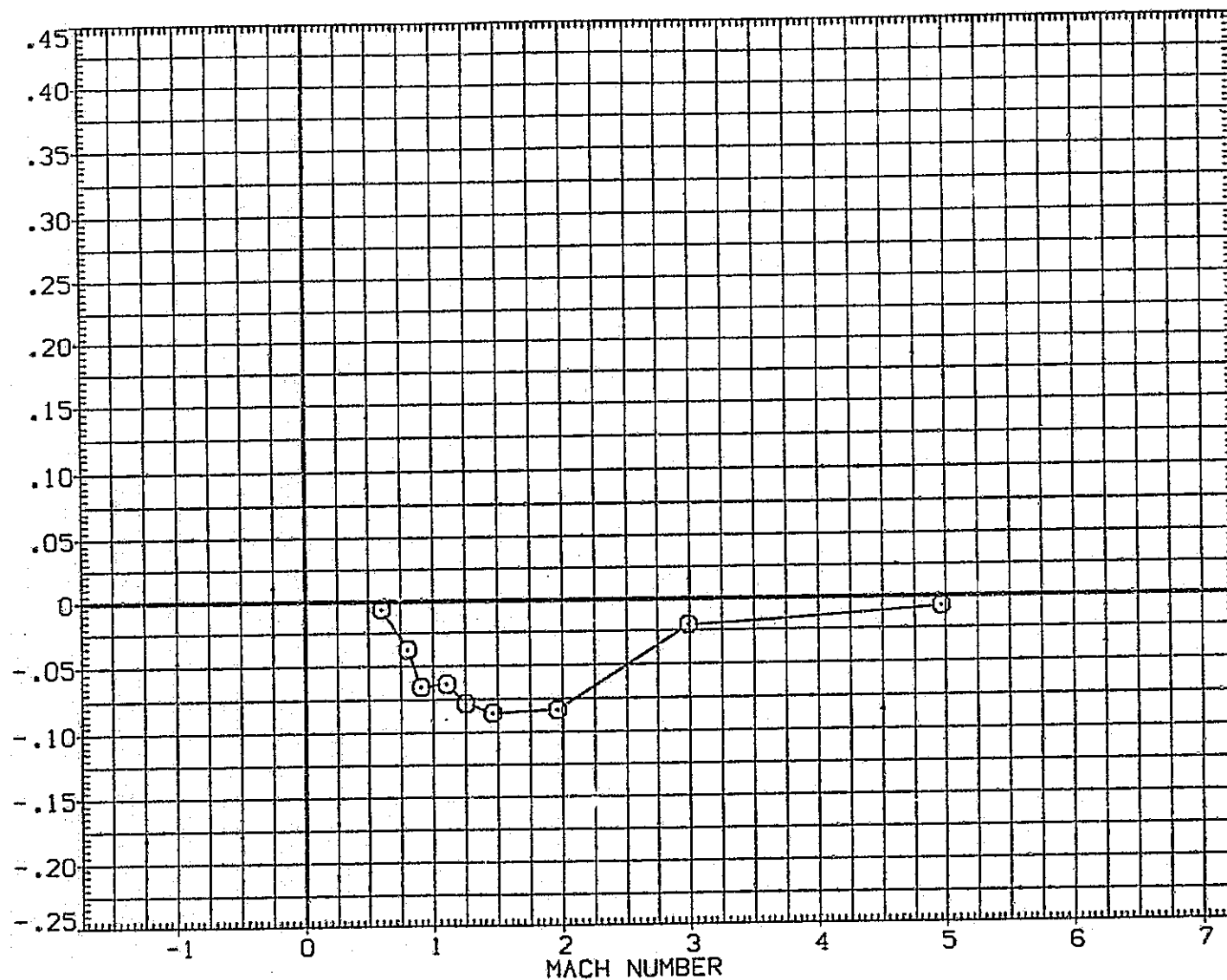


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG

(1) ALPHA = 6.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) O MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

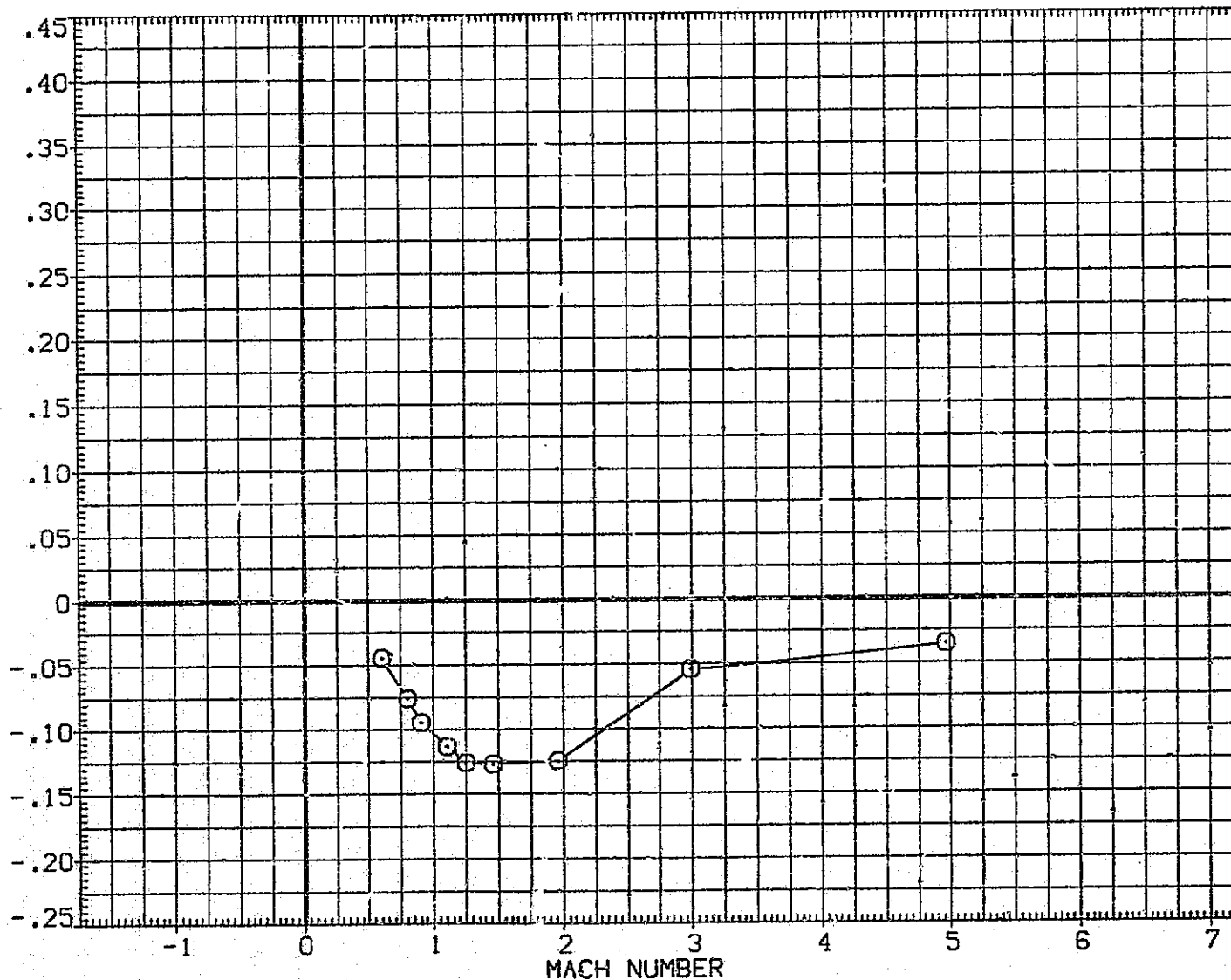


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (J) ALPHA = 8.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC007) ○ MSFC 594(1A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

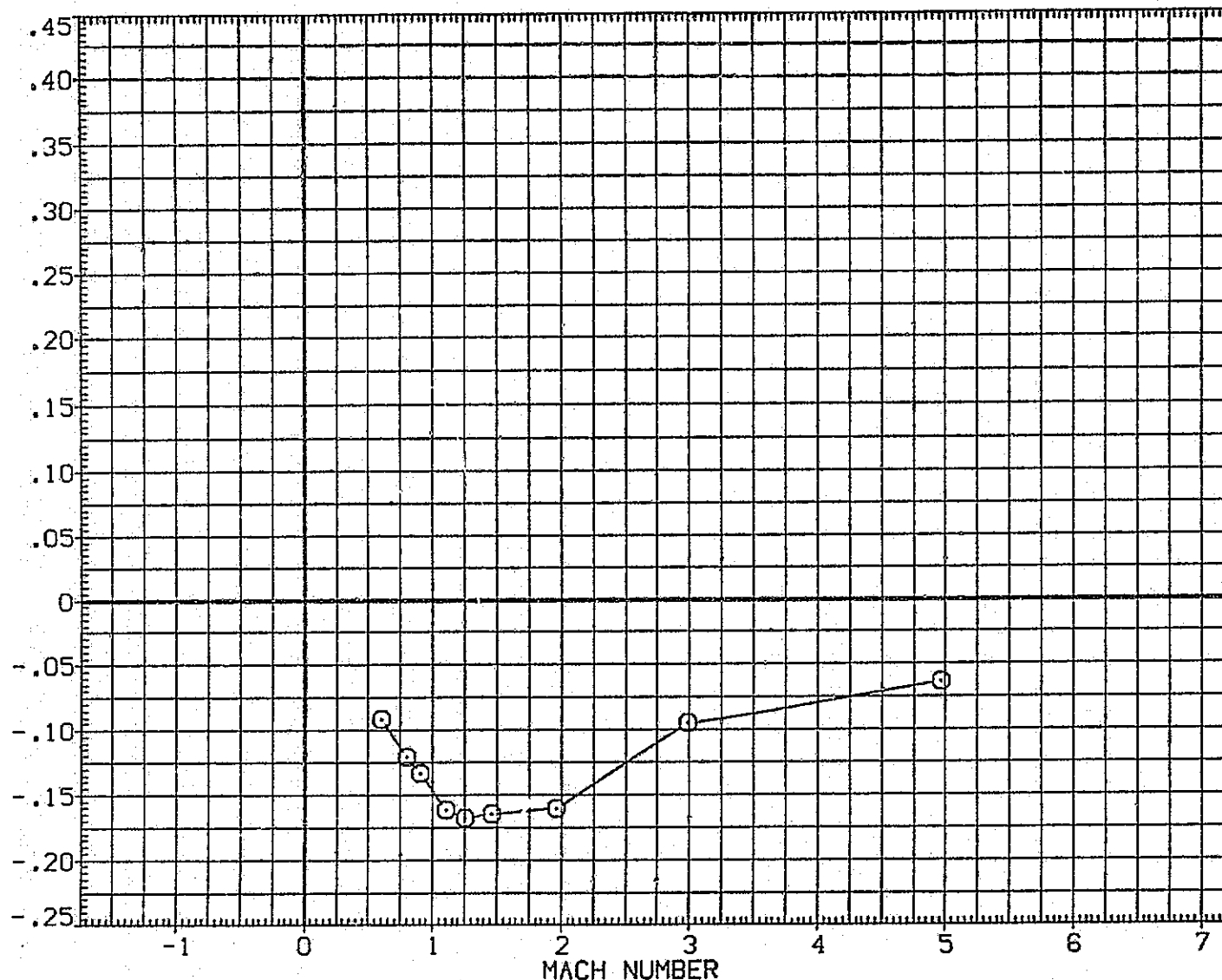


FIG 6 LAUNCH VEHICLE-FIRST STAGE-LONGITUDINAL CHARACTERISTICS, BETA = 0 DEG
 (K) ALPHA = 10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
(A1C008)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING	.000
(A1C009)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING	5.000
(A1C010)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

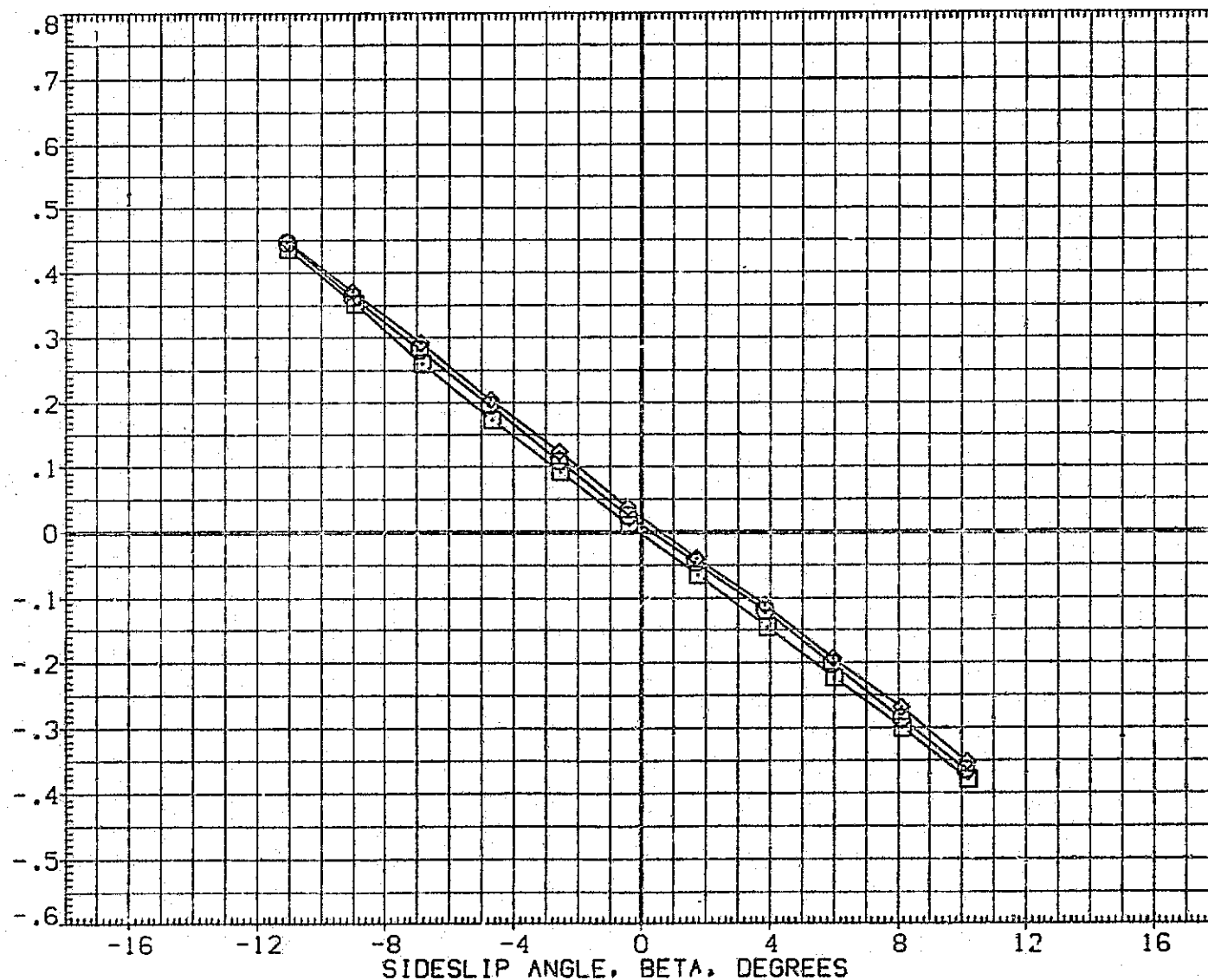


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(A)MACH = .60

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008)	MSFC 594(A33) 740TS (TIPISIP201)
(AIC009)	MSFC 594(A33) 740TS (TIPISIP201)
(AIC010)	MSFC 594(A33) 740TS (TIPISIP201)

ORBITAL STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

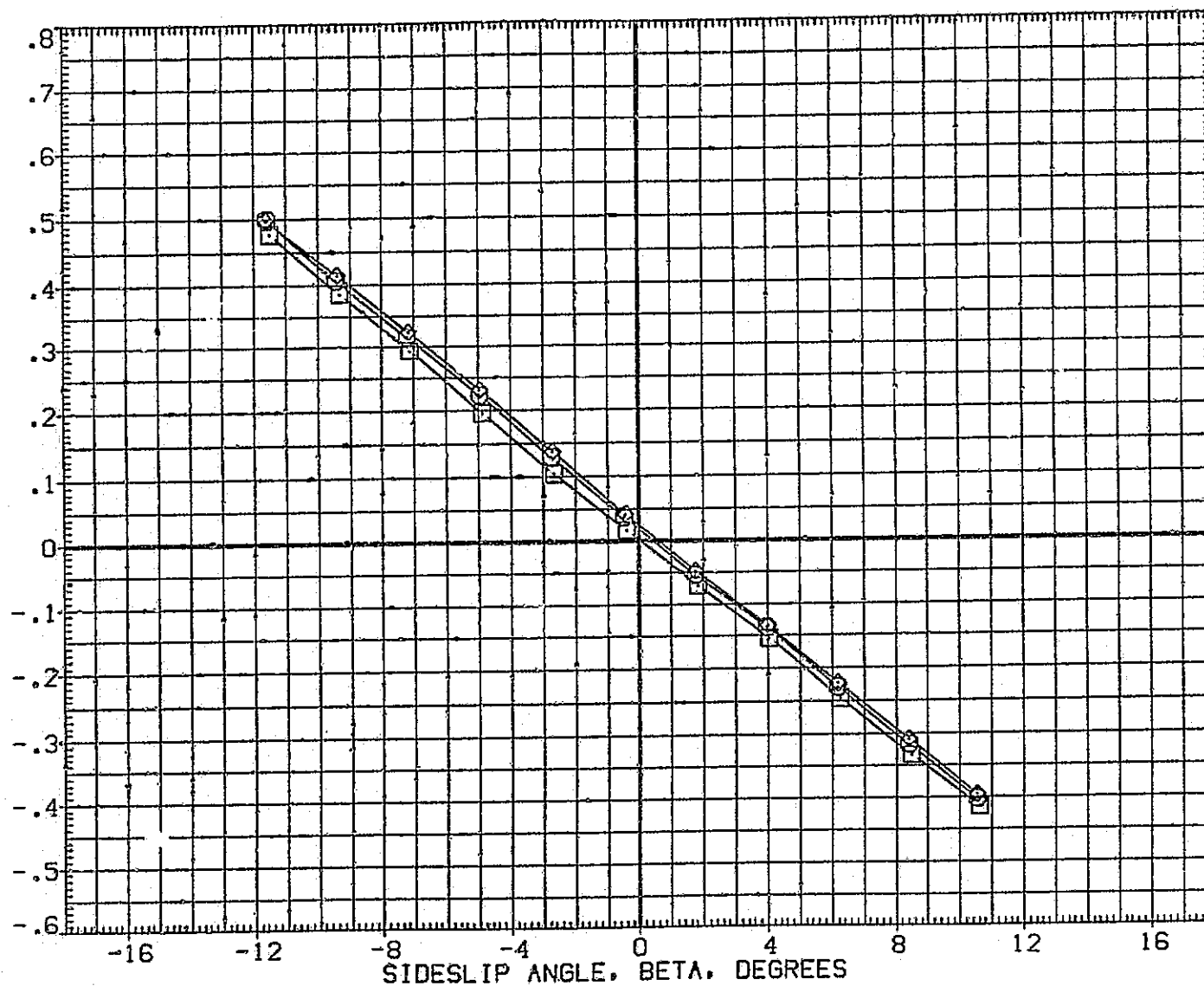


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008)	MSFC 594(IA33) 740TS (TIPISIP201)
(AIC009)	MSFC 594(IA33) 740TS (TIPISIP201)
(AIC010)	MSFC 594(IA33) 740TS (TIPISIP201)

ORR STING	ALPHA
ORR STING	.000
ORR STING	5.000
ORR STING	-5.000

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

SIDE-FORCE COEFFICIENT, CY

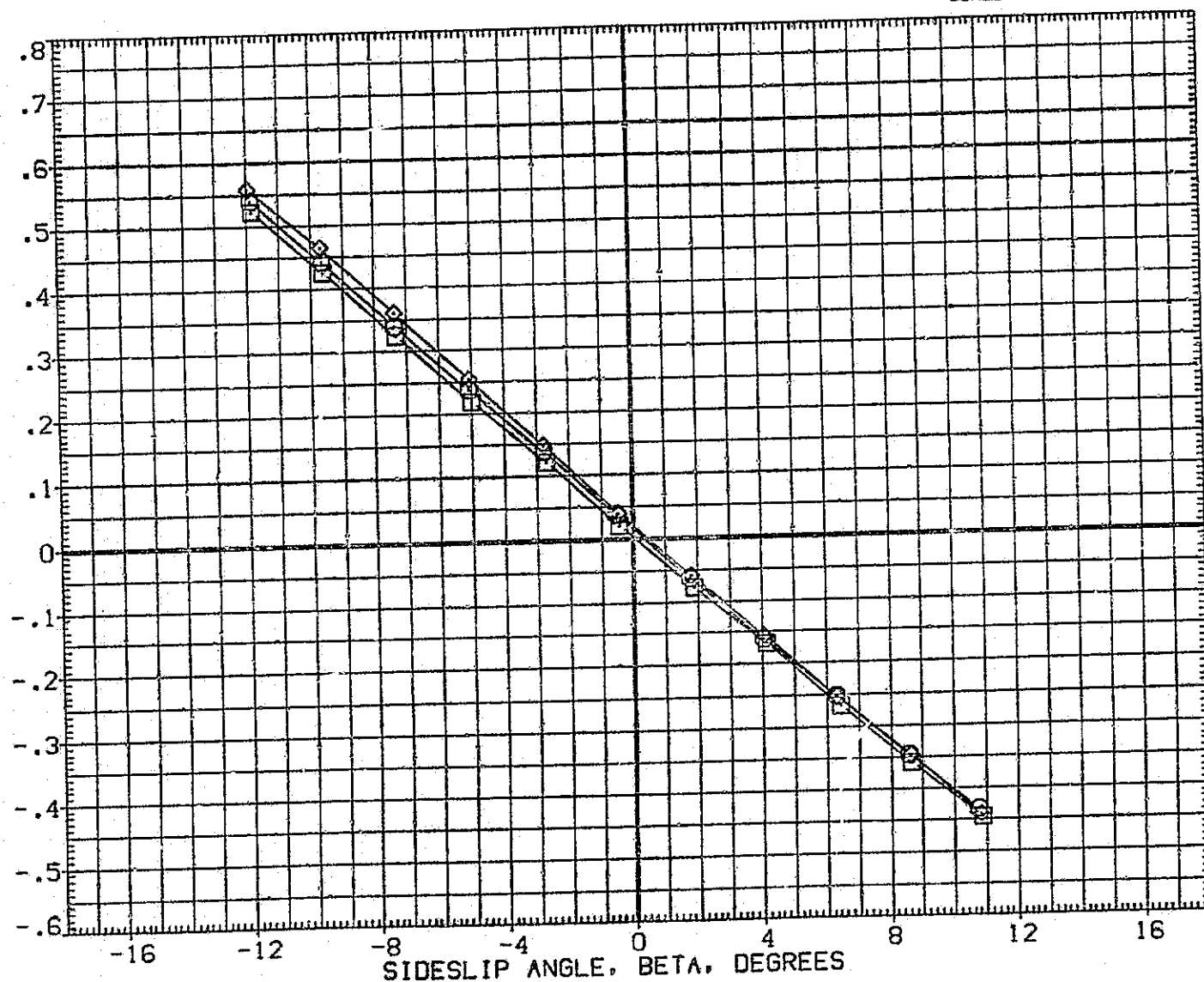


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORBIT STING
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	
(AIC009)	DATA NOT AVAILABLE	
(AIC010)	DATA NOT AVAILABLE	

ALPHA
 .000
 5.000
 -5.000

REFERENCE INFORMATION

SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1250.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

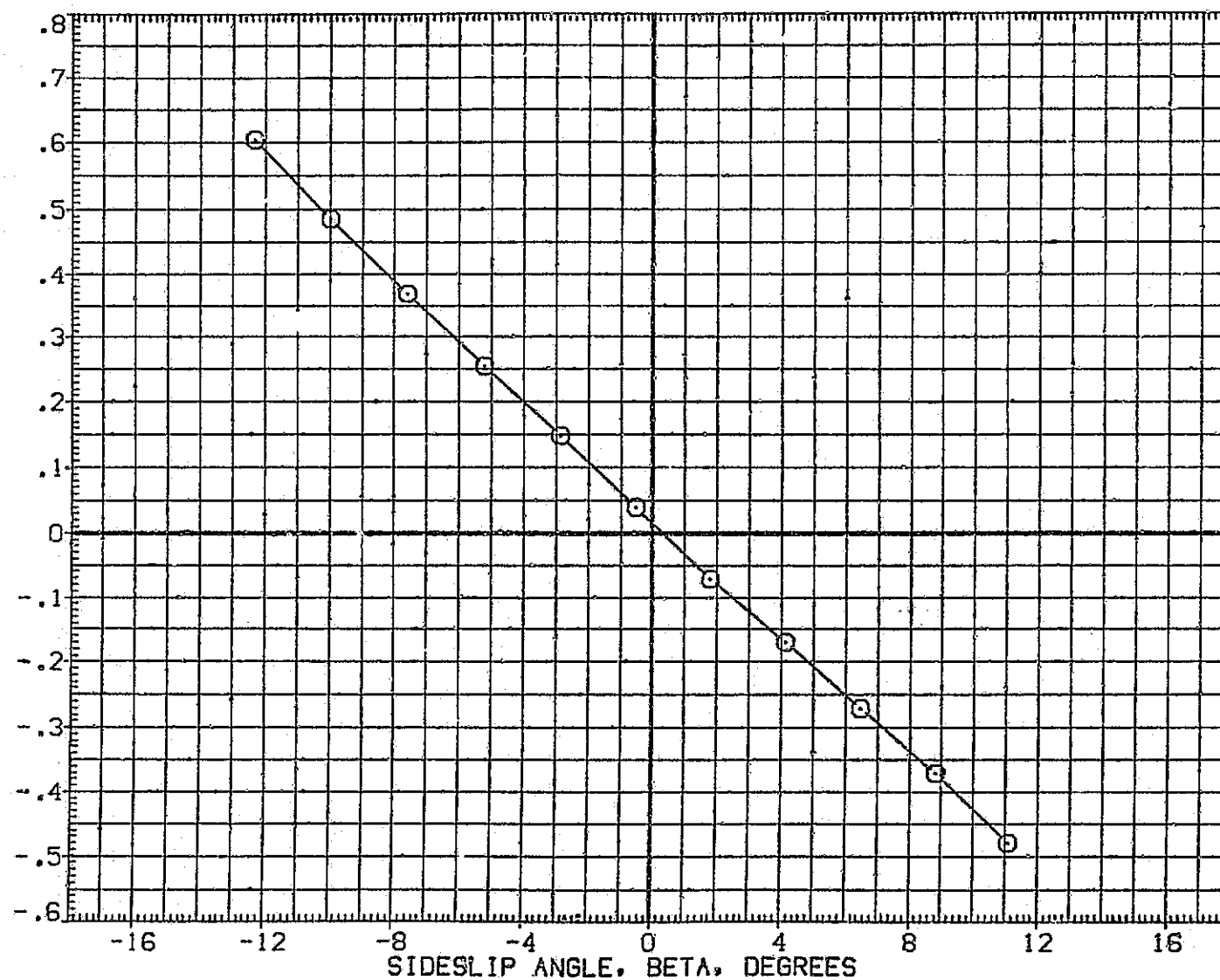


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008) □	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC009) □	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC010) ◇	MSFC 594(1A33) 740TS (TIPISIP201)

ORF STING	ALPHA
ORF STING	.000
ORF STING	5.000
ORF STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

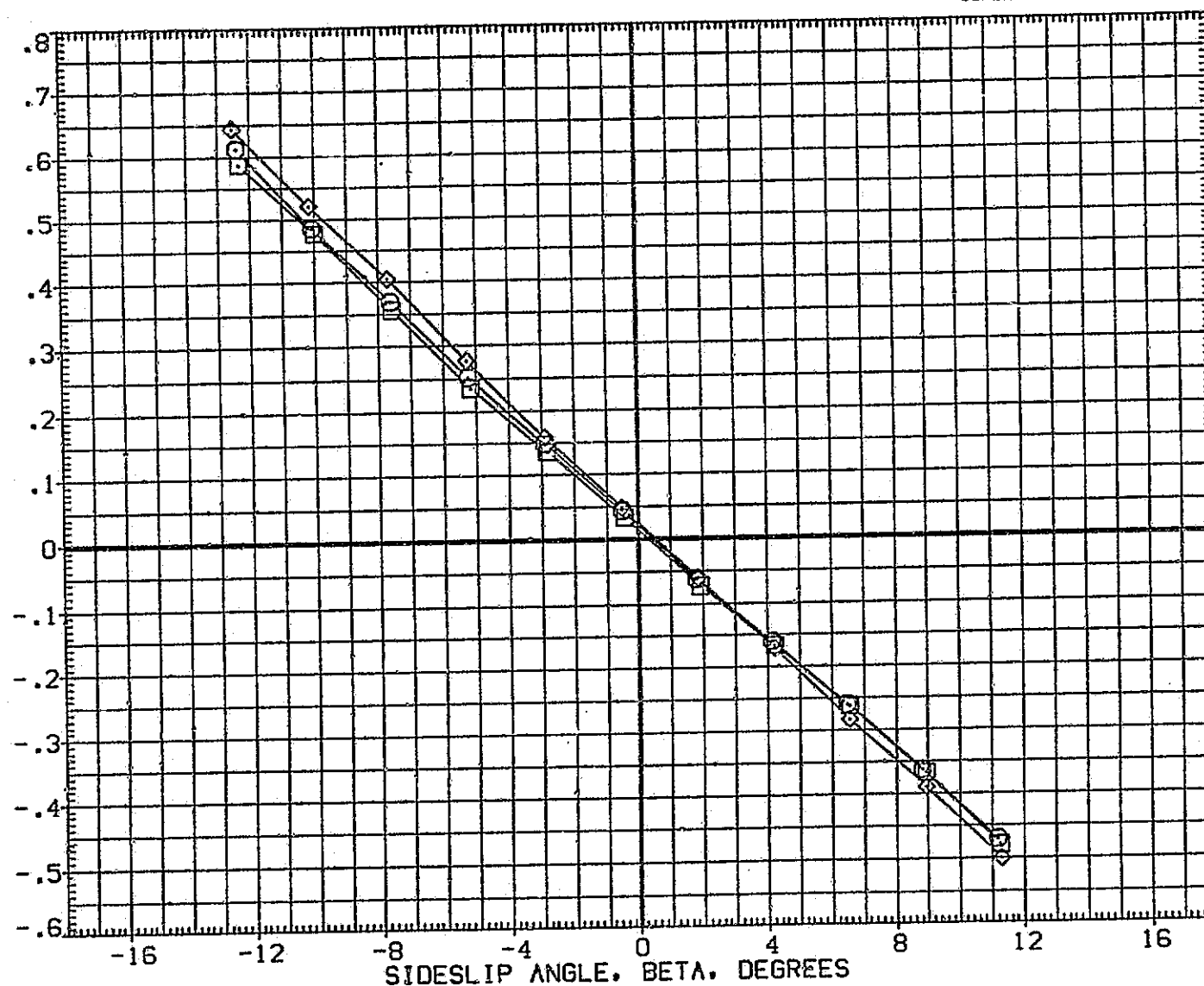


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C008)	MSFC 594(1A33) 740TS (TIPISIP201)
(A1C009)	MSFC 594(1A33) 740TS (TIPISIP201)
(A1C010)	MSFC 594(1A33) 740TS (TIPISIP201)

ORBIT	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
SREF	1290.0000	IN.
XMRP	576.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

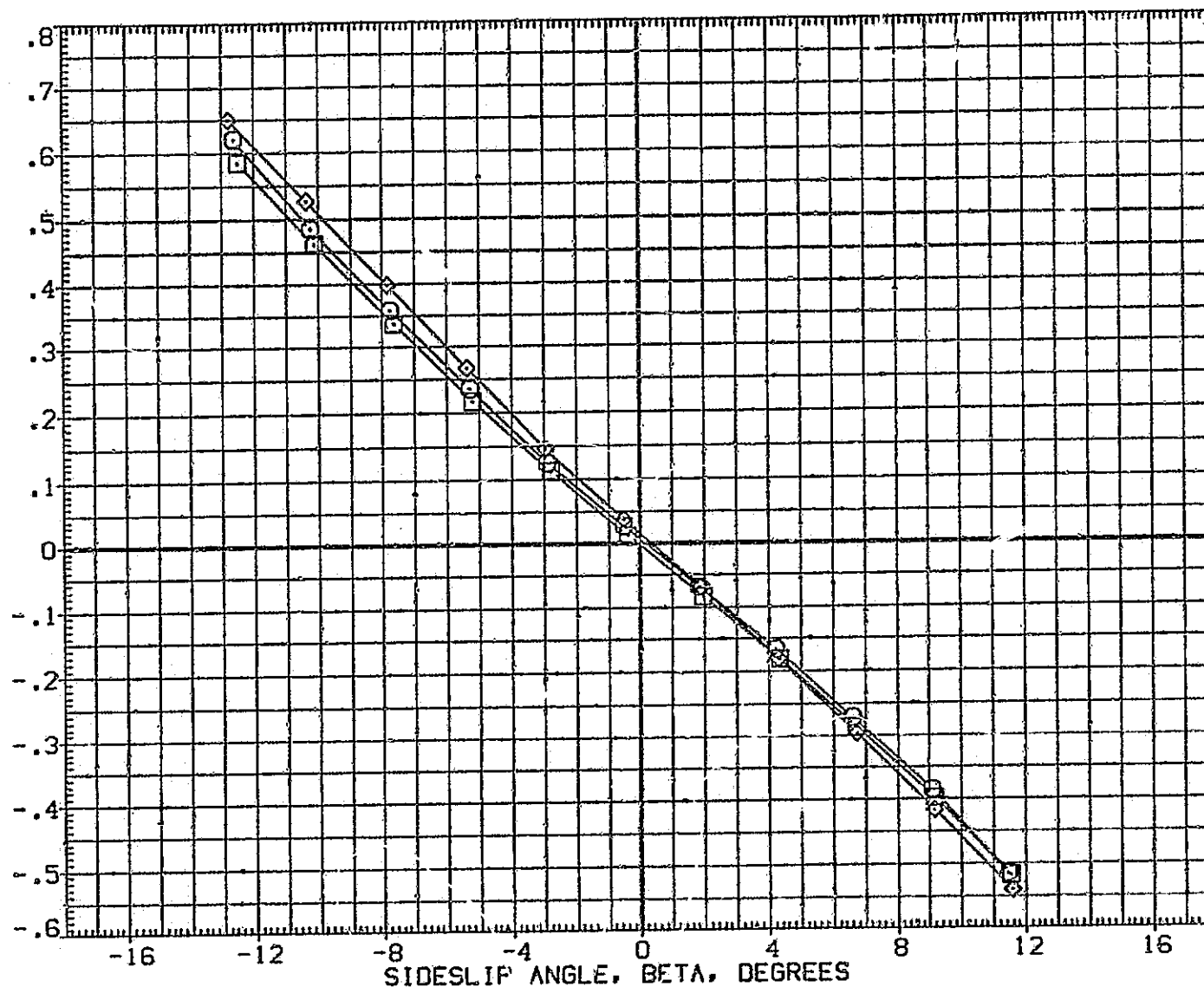


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(F)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC009)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC010)	MSFC 594(1A33) 740TS (TIPISIP201)

ORBITAL STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

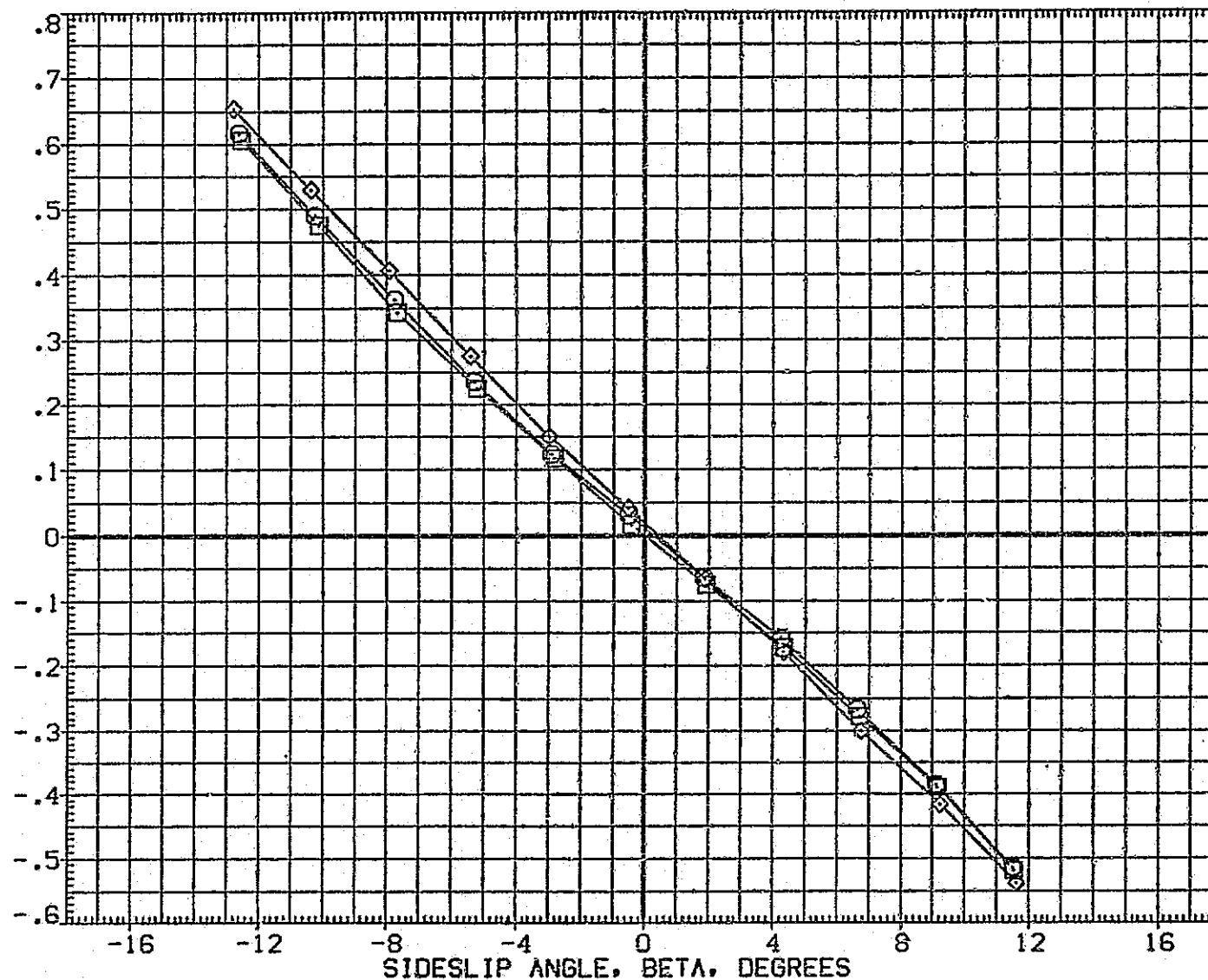


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(G)MACH = 1.47

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC009)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC010)	MSFC 594(1A33) 740TS (TIPISIP201)

ORIG	STING	ALPHA
ORB	STING	.000
ORB	STING	5.000
ORB	STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

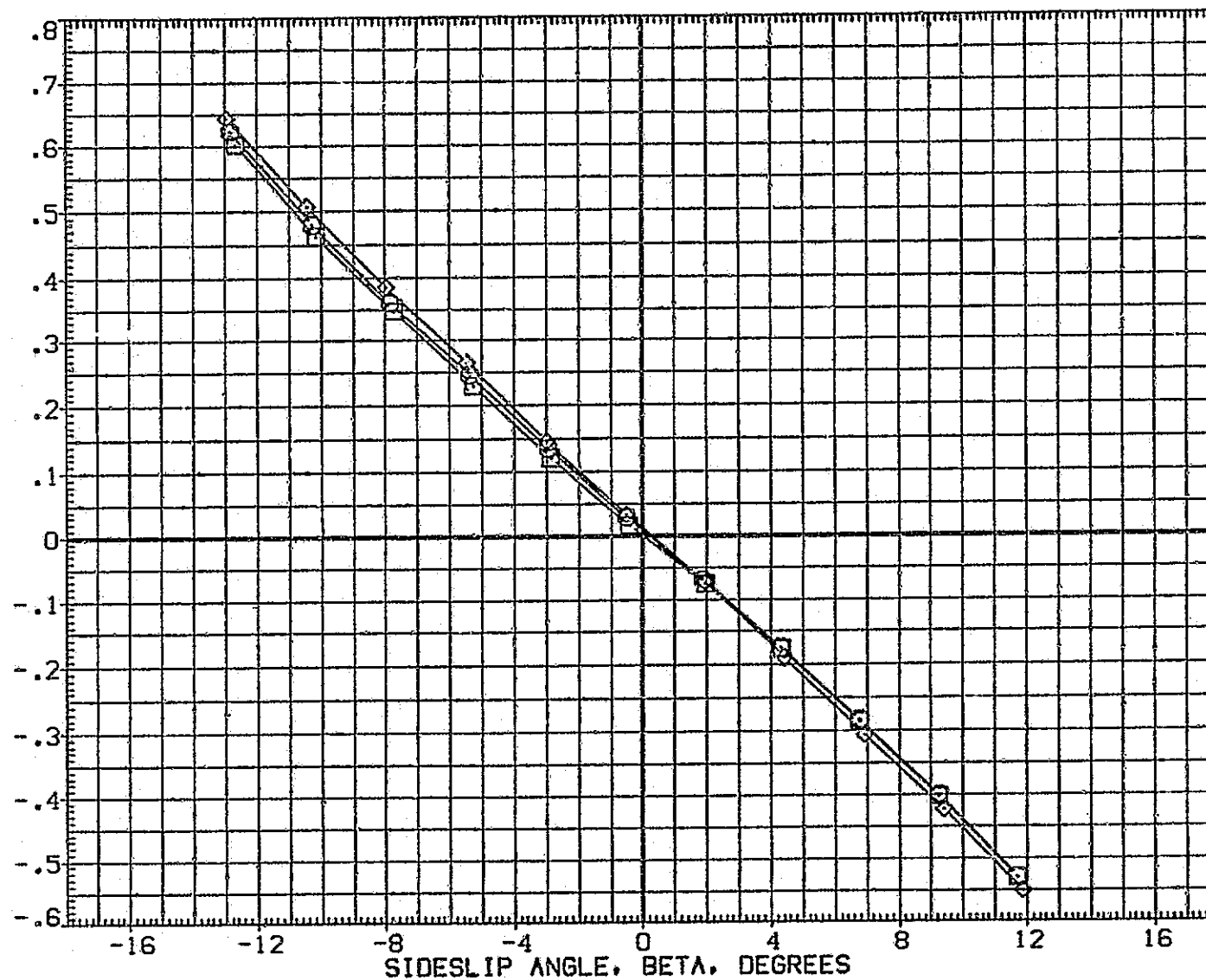


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(H)MACH = 1.97

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC009)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC010)	MSFC 594(1A33) 740TS (TIPISIP201)

ORB STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
YMRP	976.0000	IN. XT
ZMRP	.0000	IN. YT
SCALE	400.0000	IN. YT

SIDE-FORCE COEFFICIENT, CY

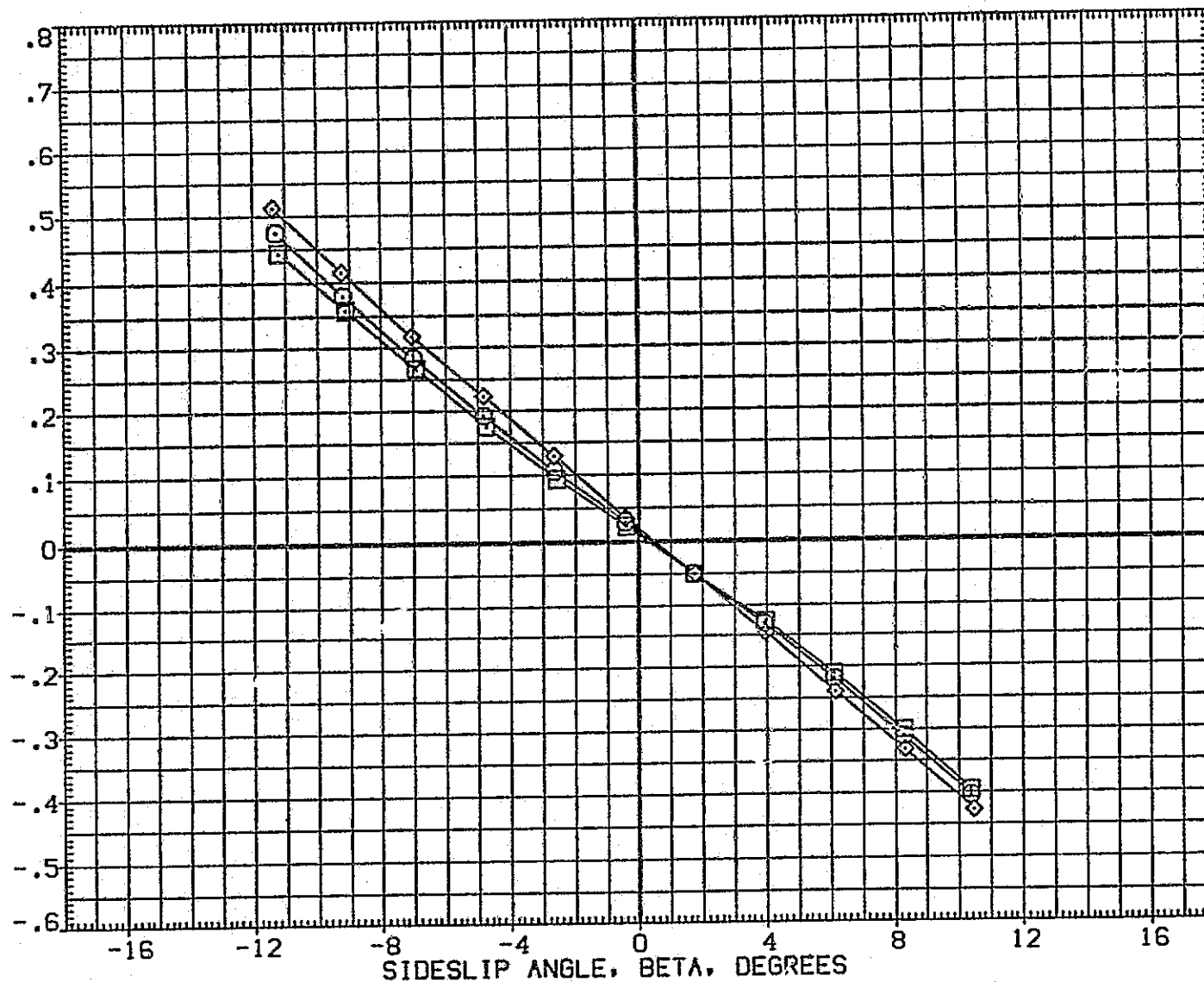


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(1)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC009)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC010)	MSFC 594(1A33) 740TS (TIPISIP201)

ORBIT	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

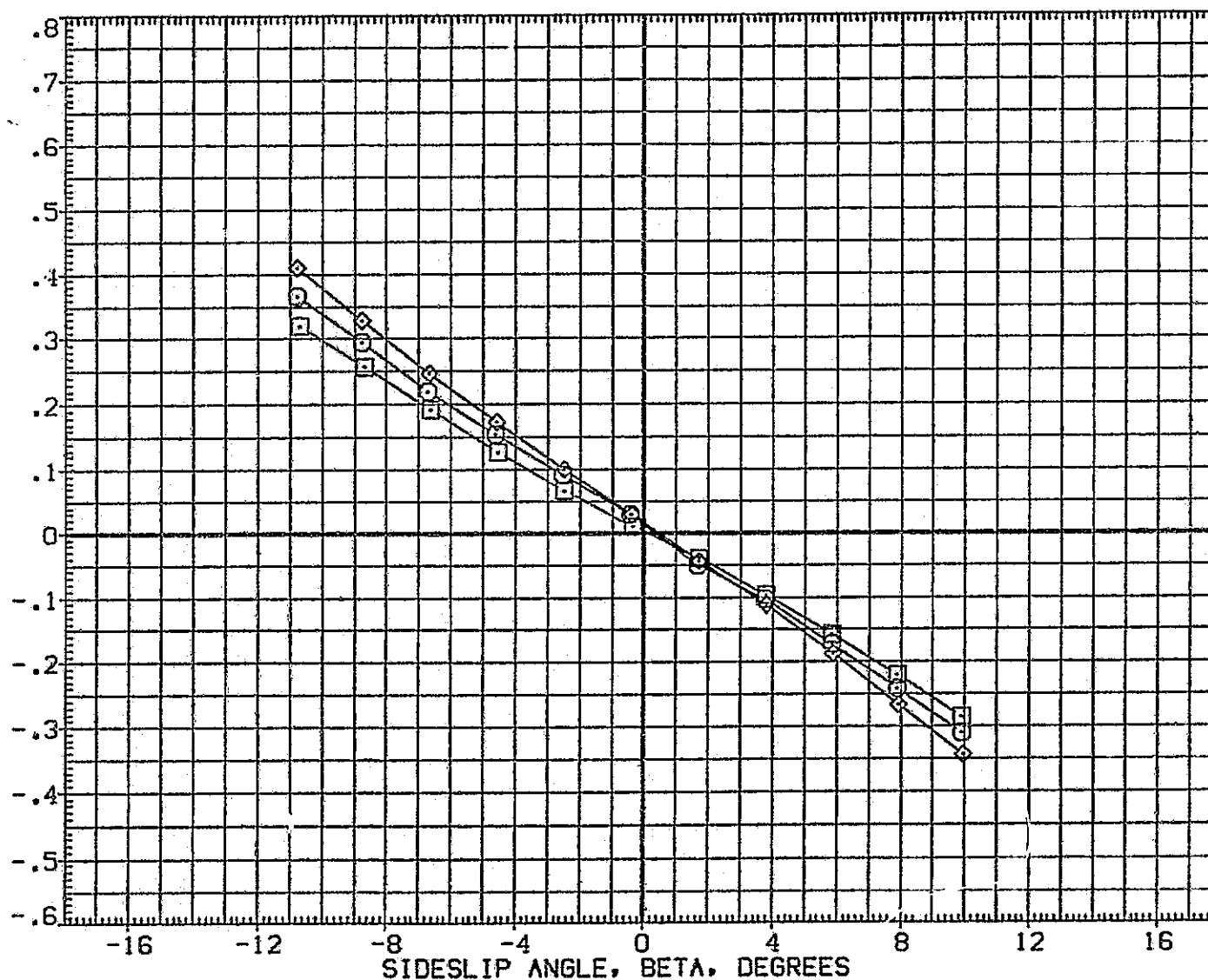


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	.000
(AIC009)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	5.000
(AIC010)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

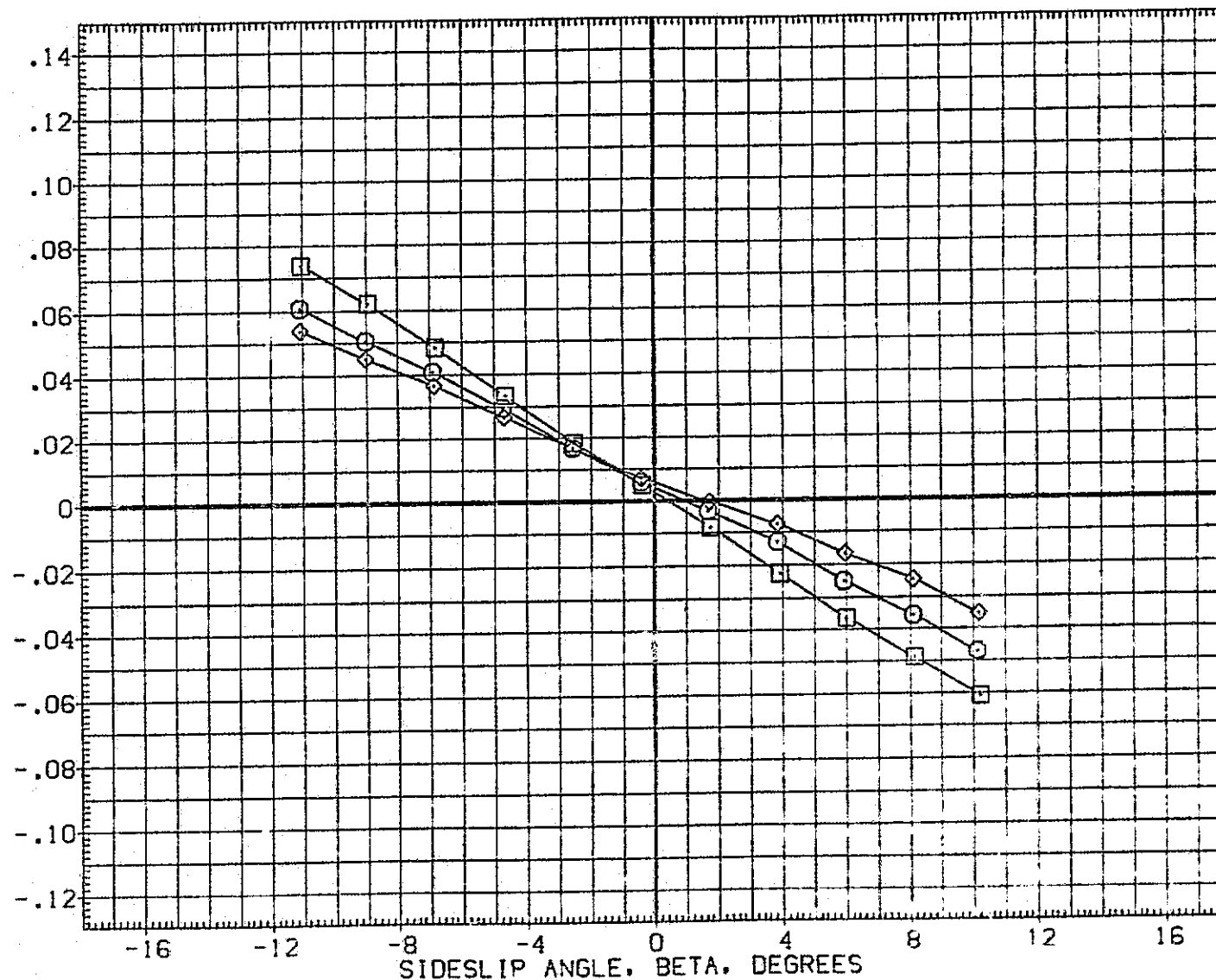


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
(AIC008)	MSFC 594(1A33) 740TS (TIP(SIP201)	ORB STING	.000
(AIC009)	MSFC 594(1A33) 740TS (TIP(SIP201)	ORB STING	5.000
(AIC010)	MSFC 594(1A33) 740TS (TIP(SIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
REF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

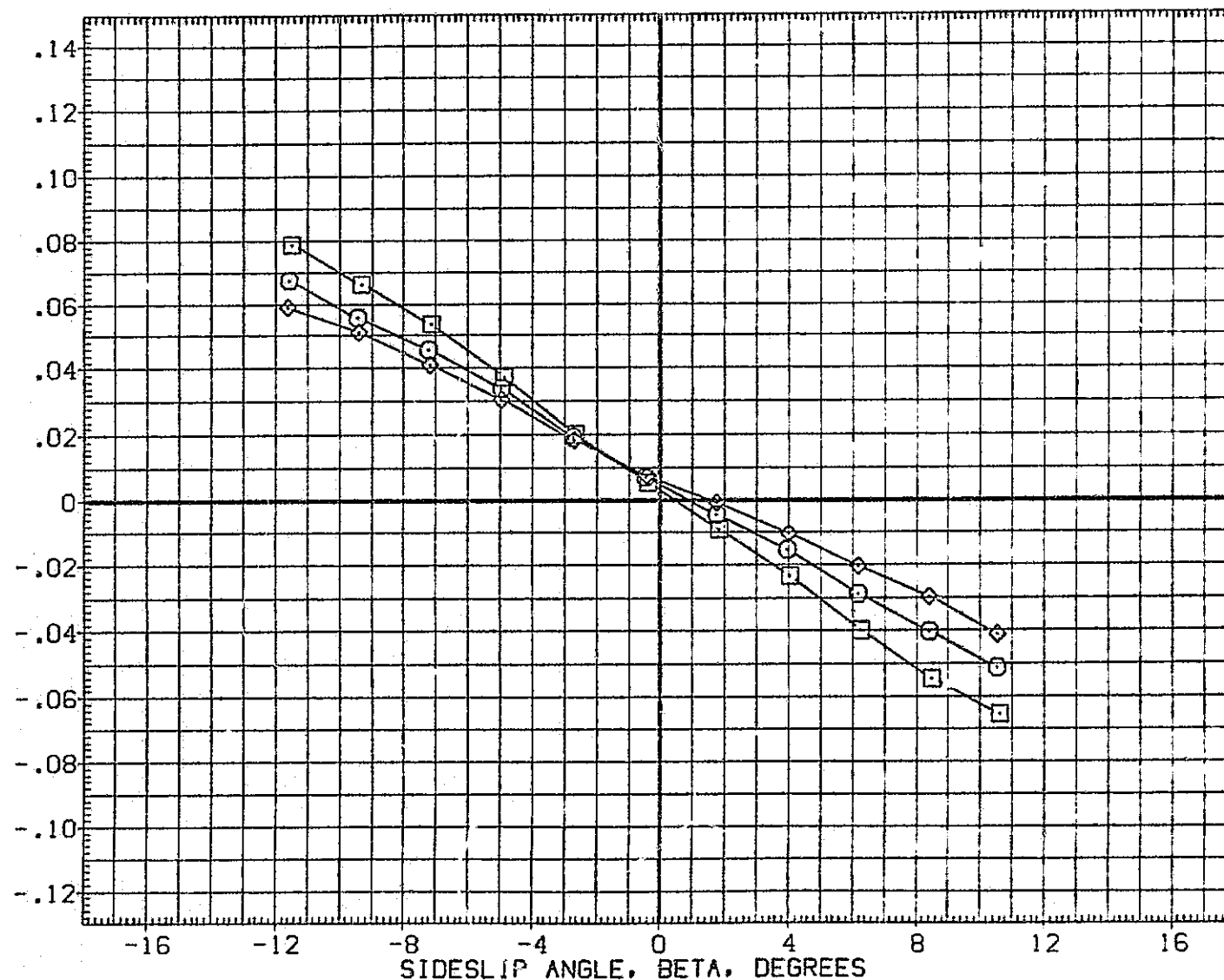


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC009)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC010)	MSFC 594(1A33) 740TS (TIPISIP201)

ORIG STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

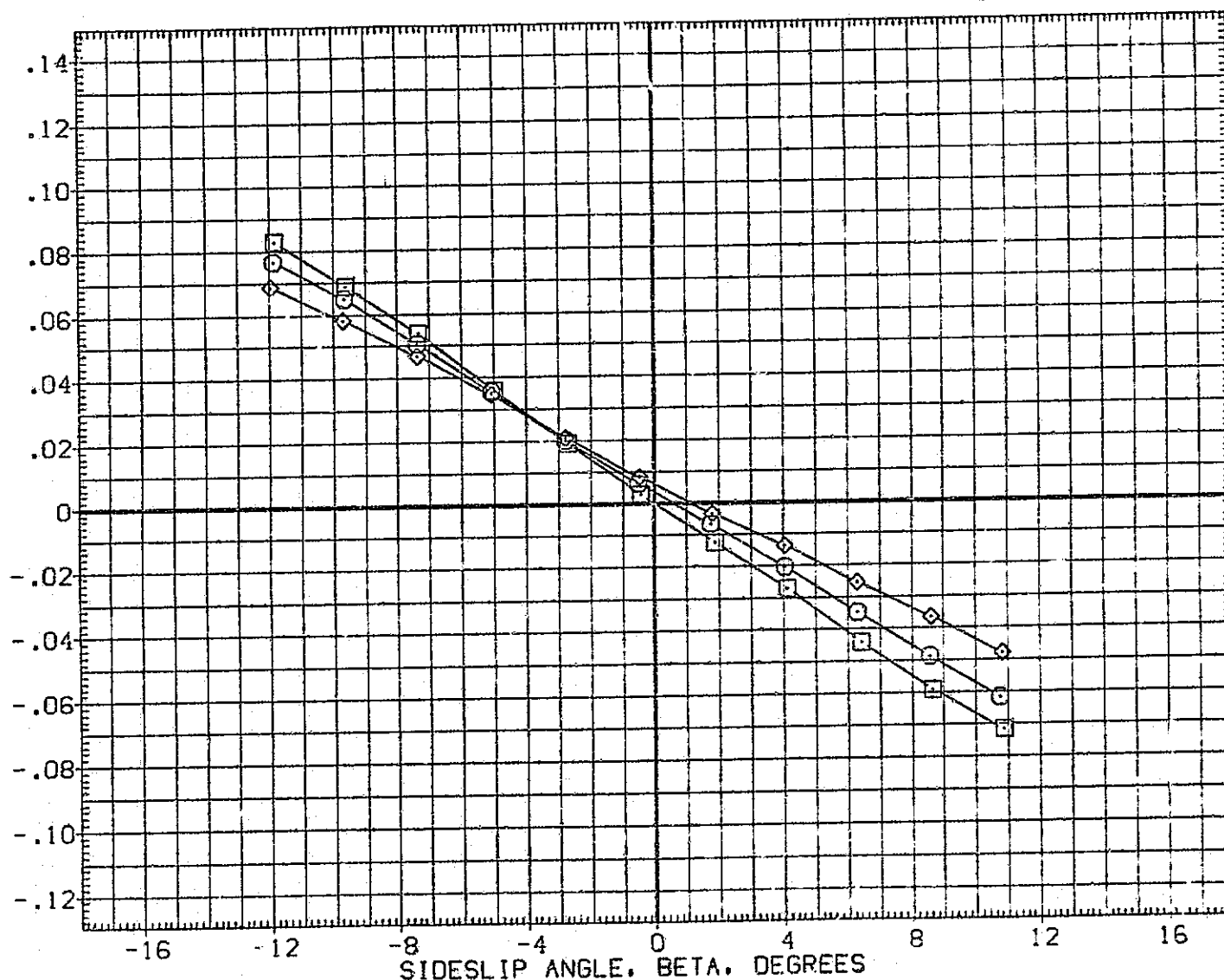


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	CRB STING
(AIC008) □	MSFC S94(1A33) 740TS (T1P1S1P201)	
(AIC009) □	DATA NOT AVAILABLE	
(AIC010) ◇	DATA NOT AVAILABLE	

ALPHA
 .000
 5.000
 -5.000

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

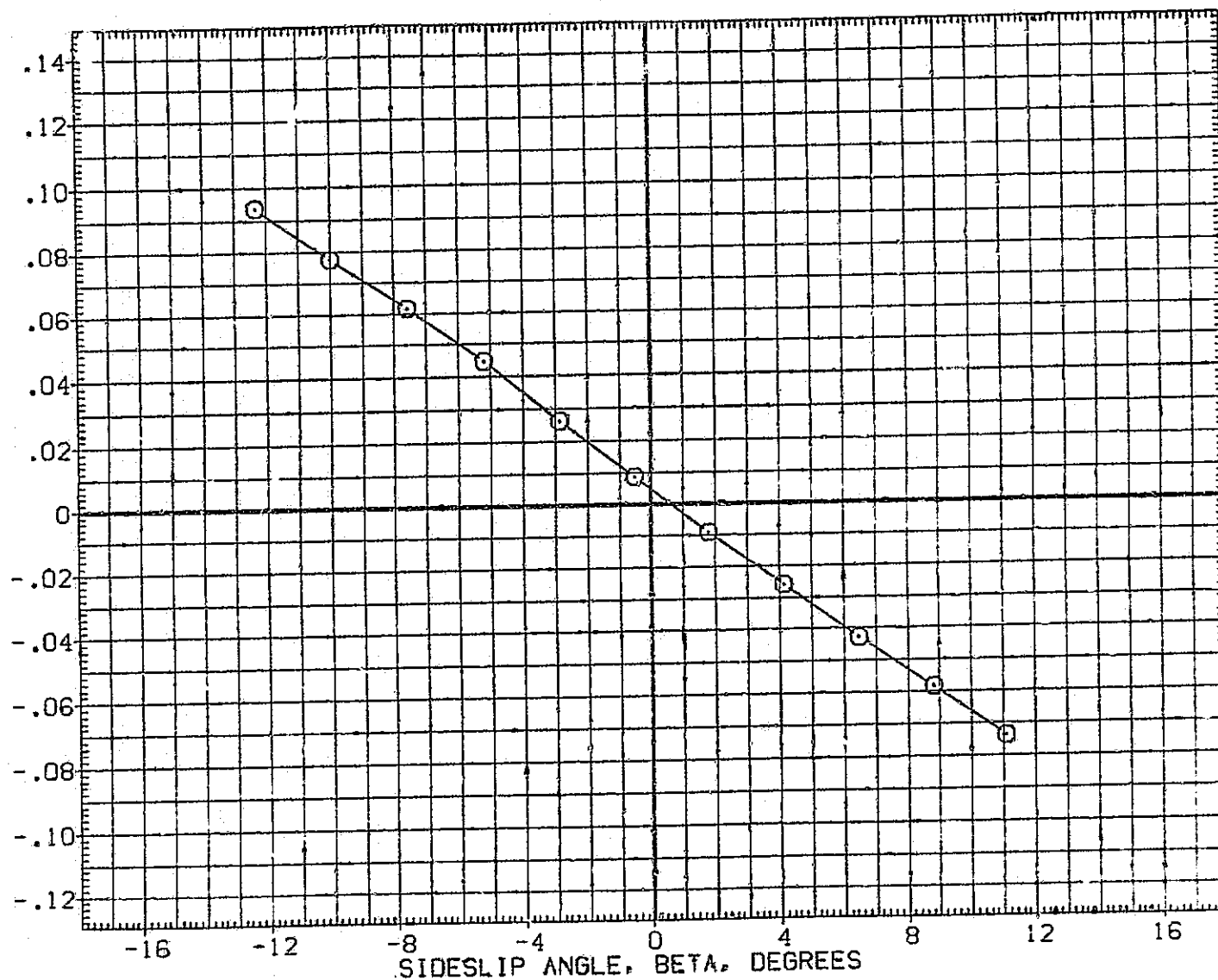


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
 (D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
[A1C008]	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	5.000
[A1C009]	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	5.000
[A1C010]	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

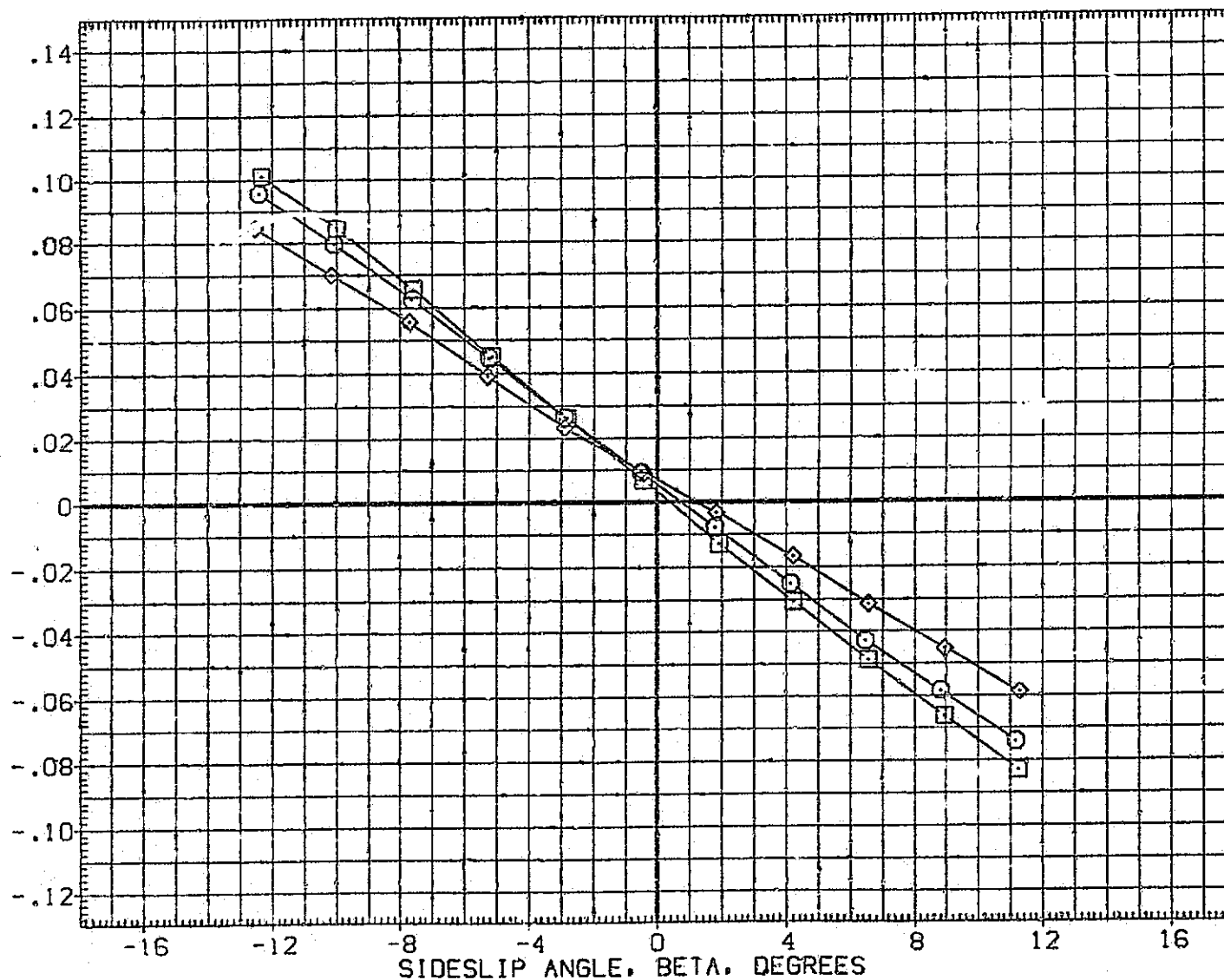


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORR STING	ALPHA
(AIC008)	MSFC 594(1A33) 743TS (TIPISIP201)	ORB STING	.000
(AIC009)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	5.000
(AIC010)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

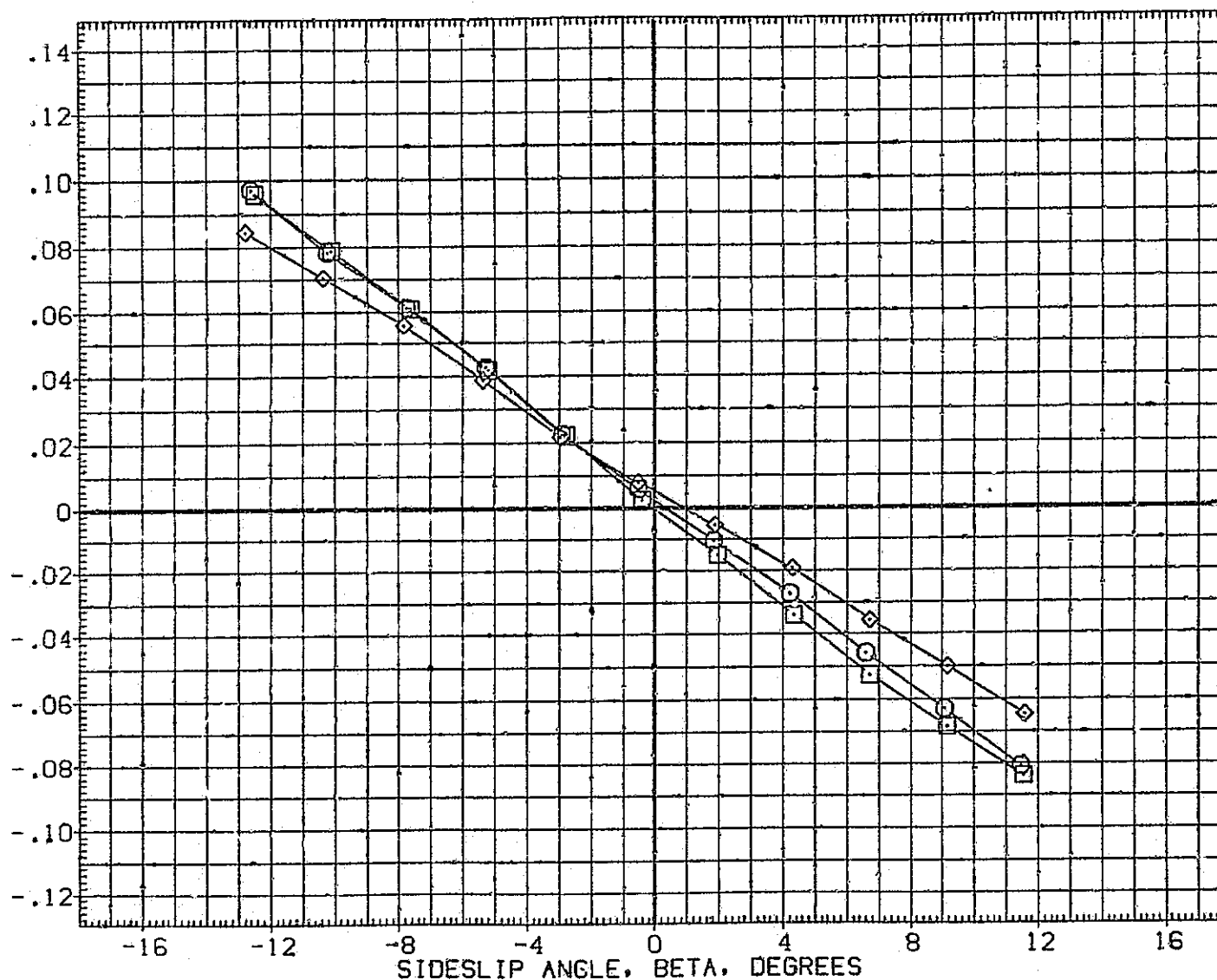


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(F)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORF STING	ALPHA
(A1C008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORF STING	.000
(A1C009)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORF STING	5.000
(A1C010)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORF STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1790.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

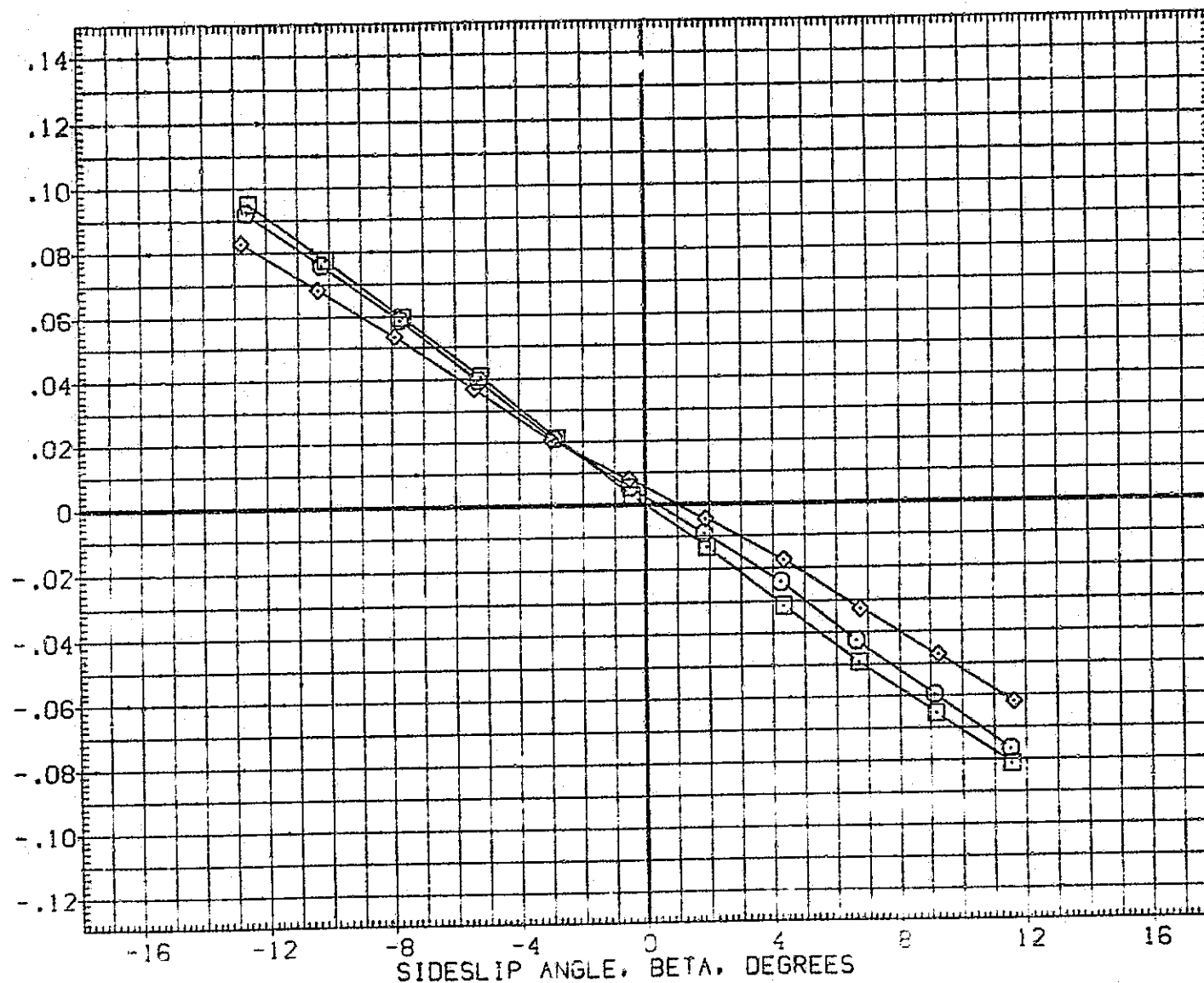


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(G)MACH = 1.47

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC009)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC010)	MSFC 594(1A33) 740TS (TIPISIP201)

ORB STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	576.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

ROLLING MOMENT COEFFICIENT, CBL

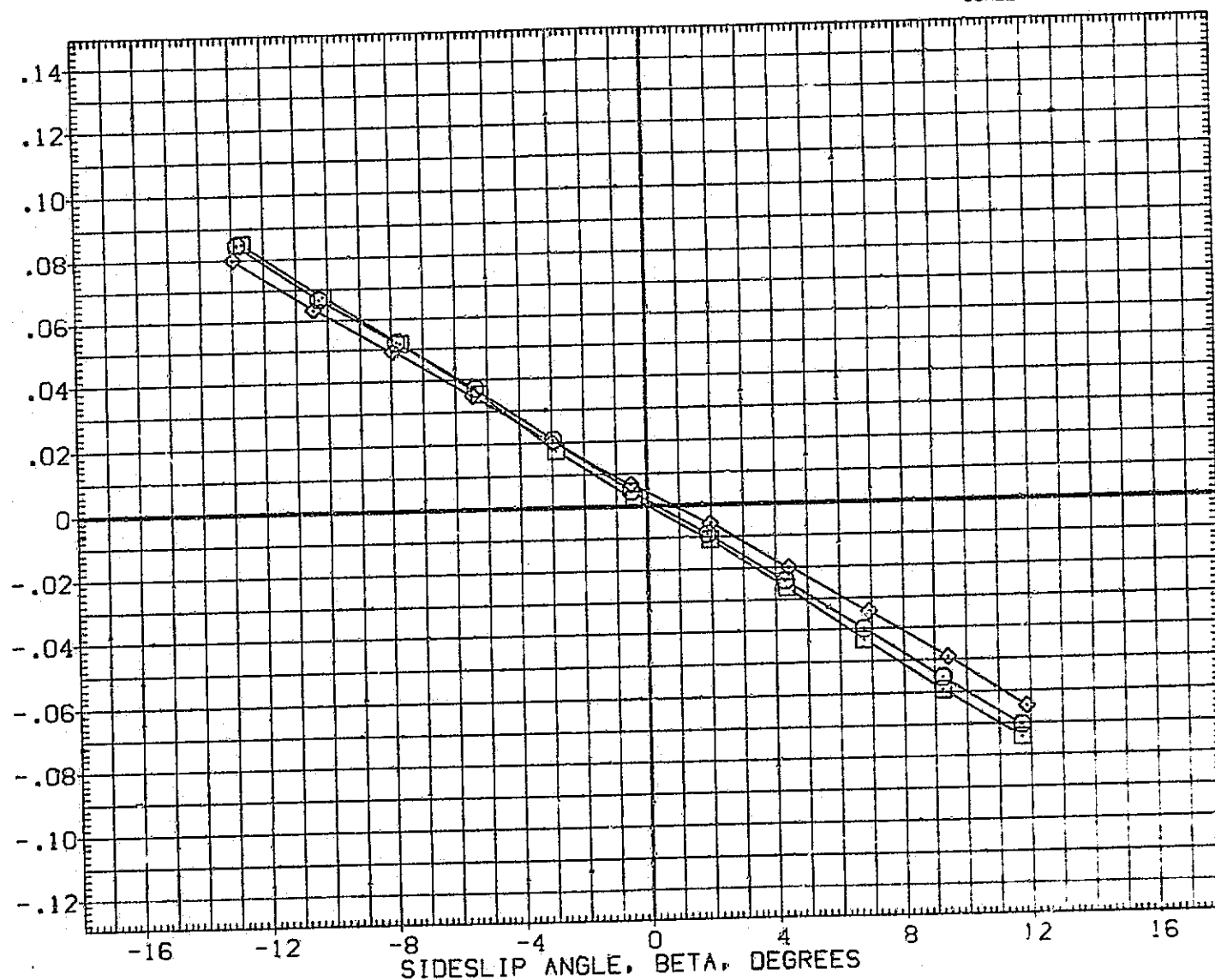


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(H)MACH = 1.97

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(AIC009)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(AIC010)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

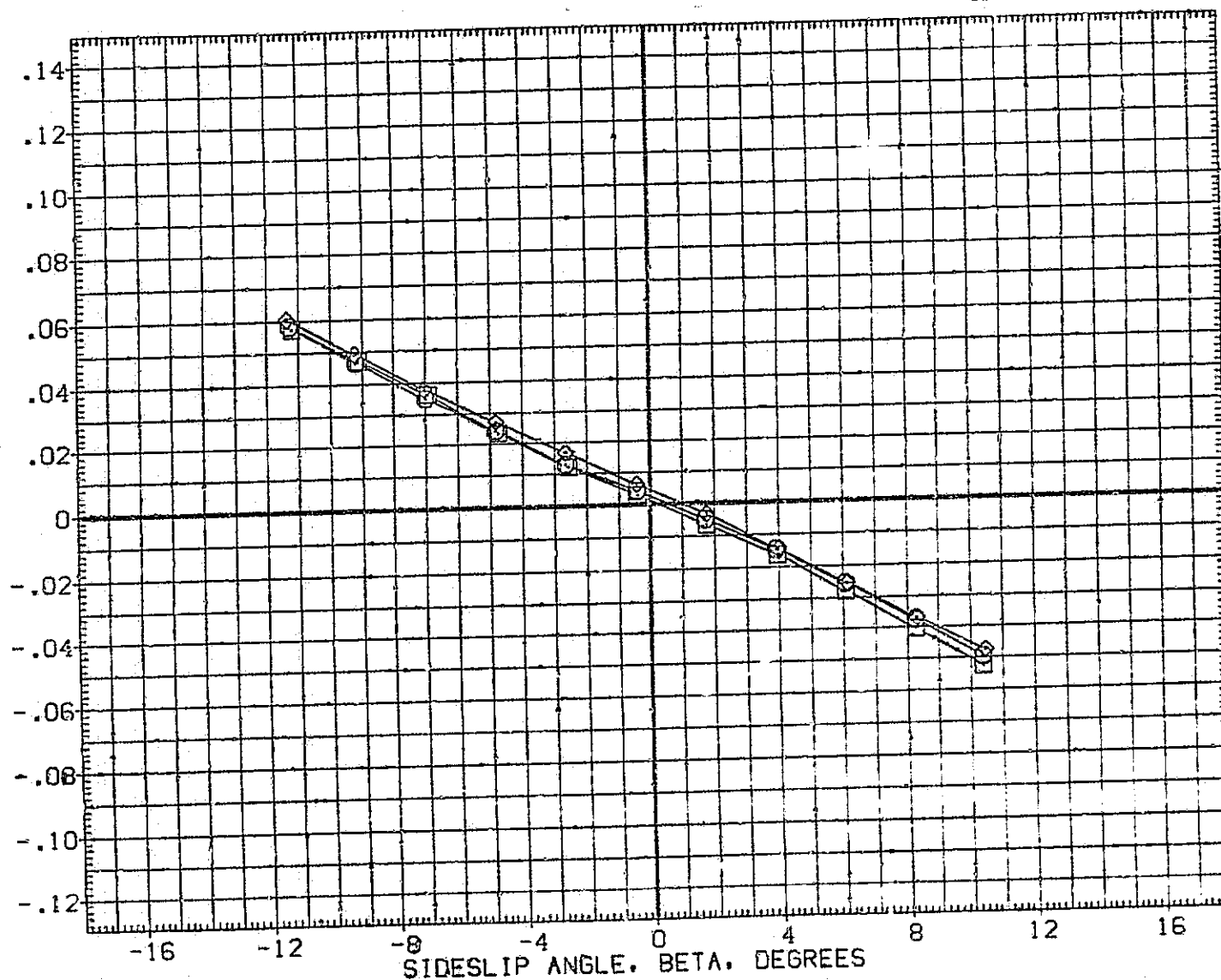


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(1)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC009)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC010)	MSFC 594(1A33) 740TS (TIPISIP201)

ORB STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	490.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

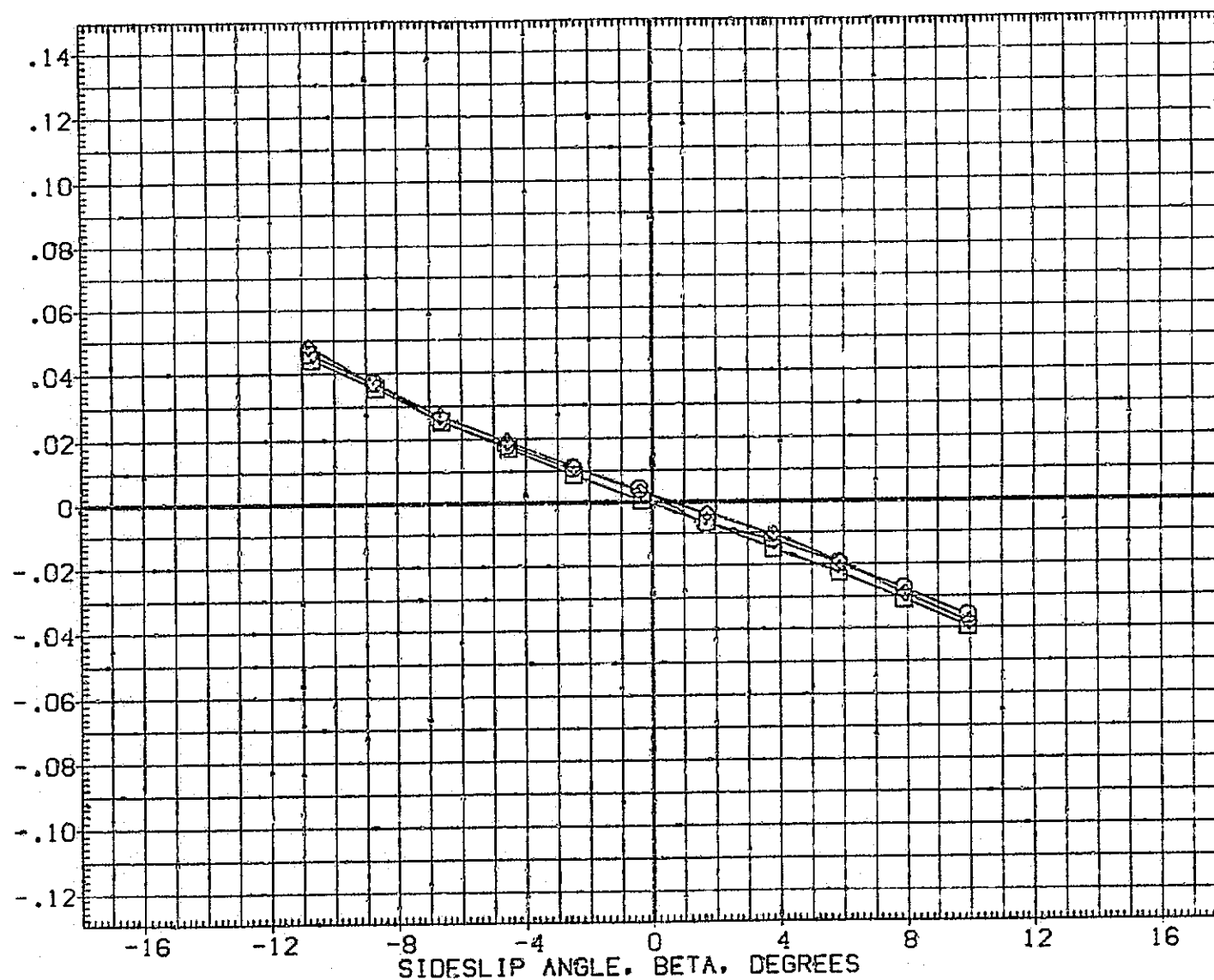


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC009)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC010)	MSFC 594(1A33) 740TS (TIPISIP201)

ALPHA
ORB STING .000
ORB STING 5.000
ORB STING -5.000

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

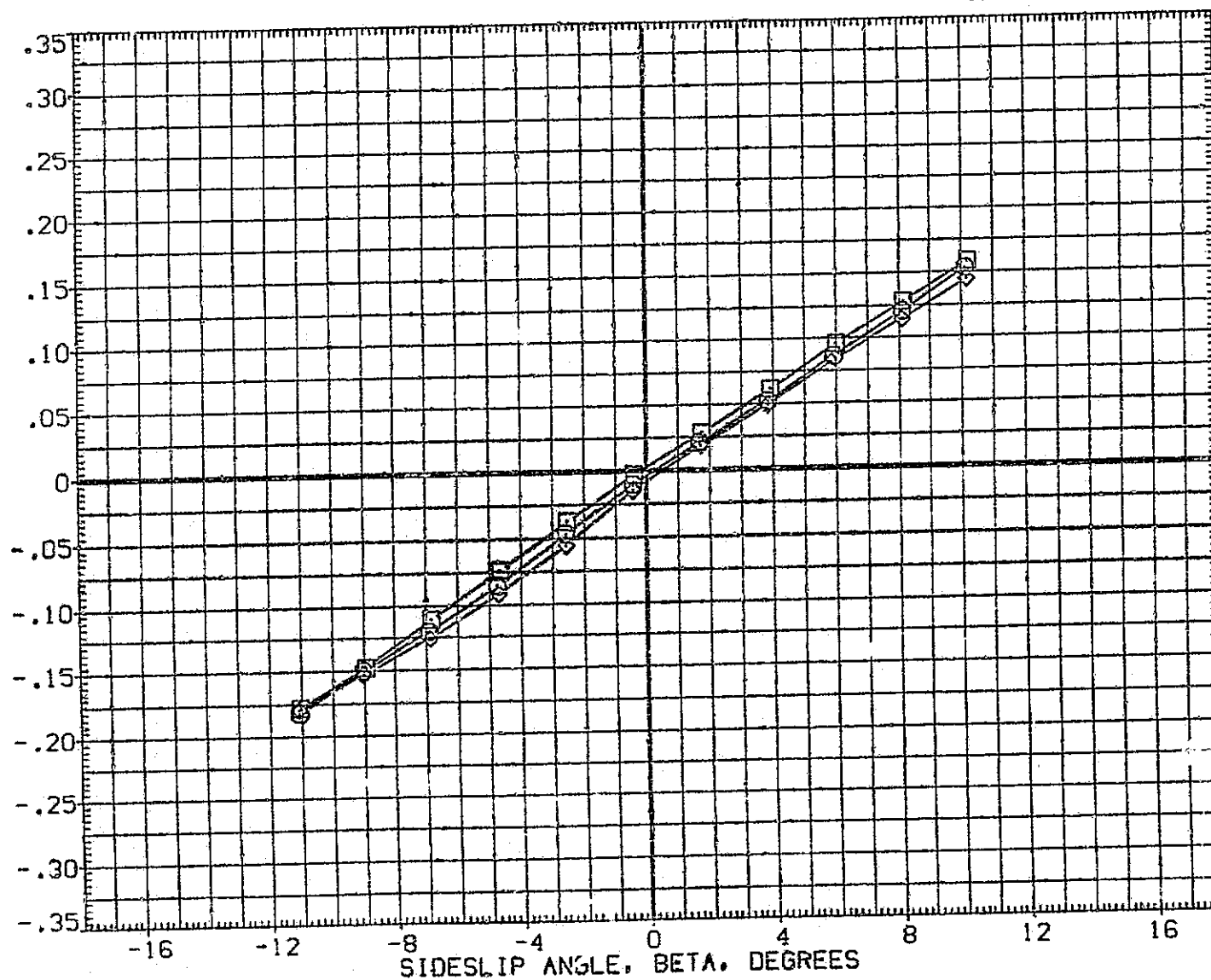


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008)	MSFC 594 (A33) 740TS (TIPISIP201)
(AIC009)	MSFC 594 (A33) 740TS (TIPISIP201)
(AIC010)	MSFC 594 (A33) 740TS (TIPISIP201)

ORB STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

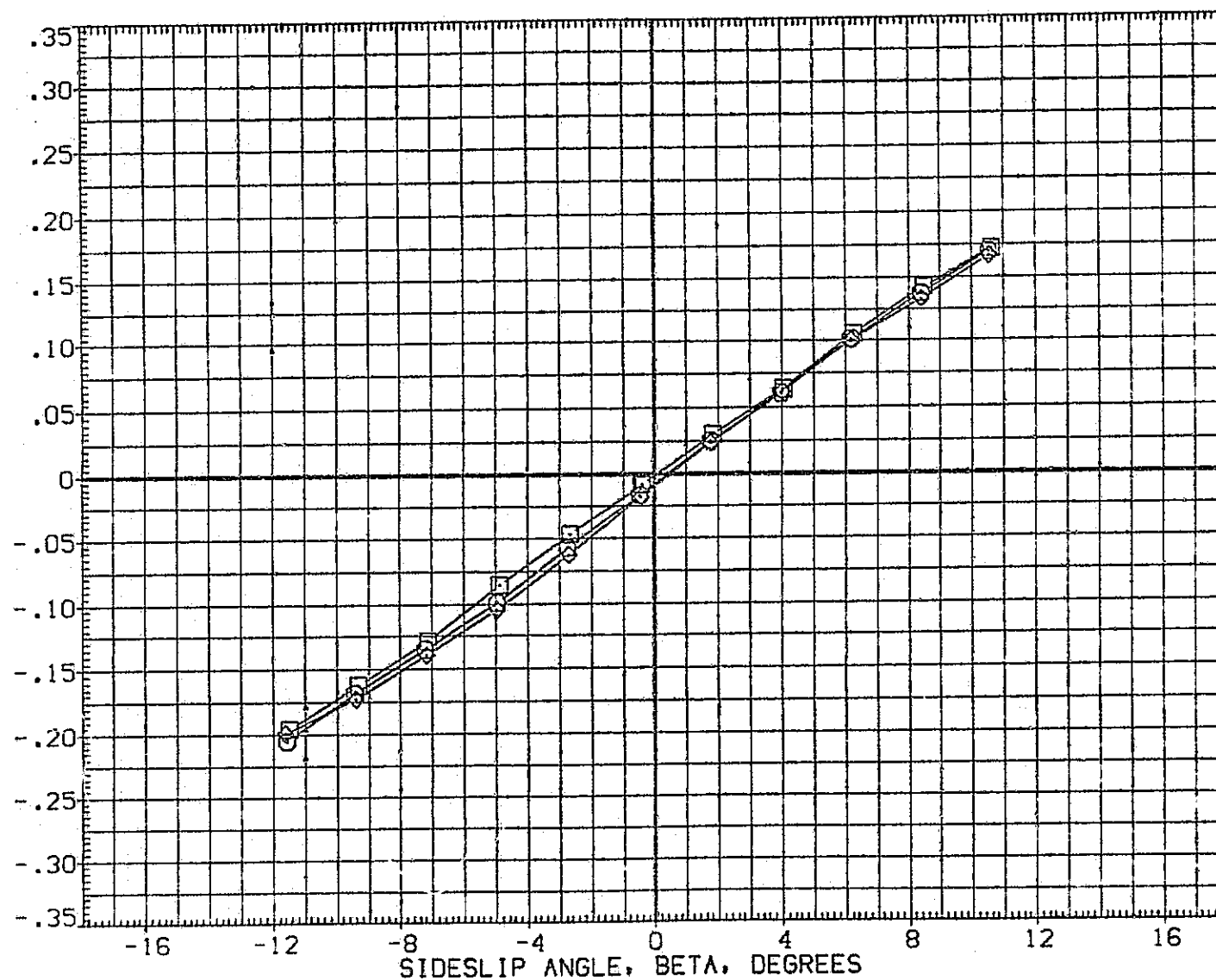


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	.000
(AIC009)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	5.000
(AIC010)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

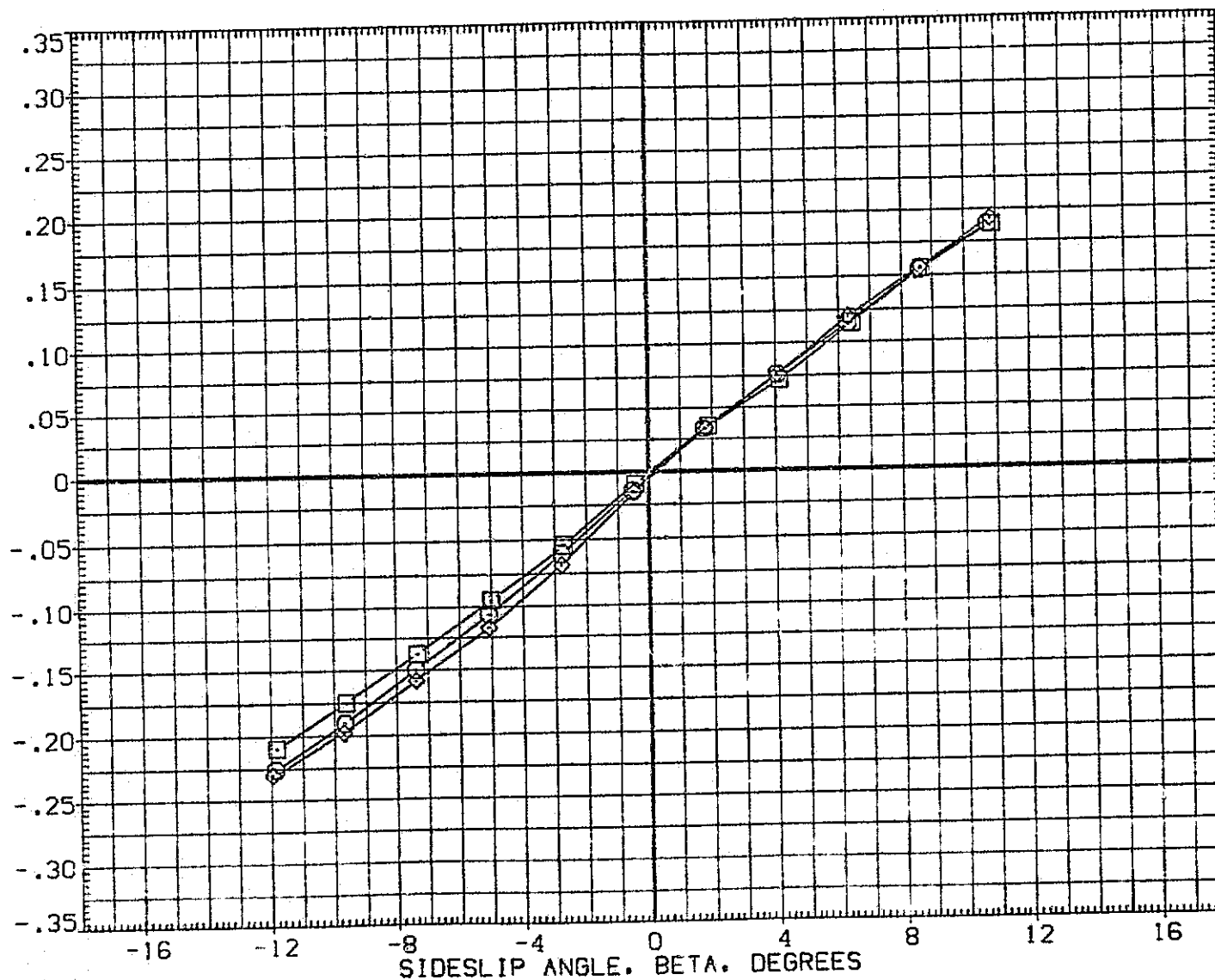


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
[A1C008] ○	MSFC 594(1A33) 740TS (TIPISIP201)	
[A1C009] □	DATA NOT AVAILABLE	
[A1C010] ◇	DATA NOT AVAILABLE	

ALPHA
 .000
 5.000
 -5.000

REFERENCE INFORMATION

SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

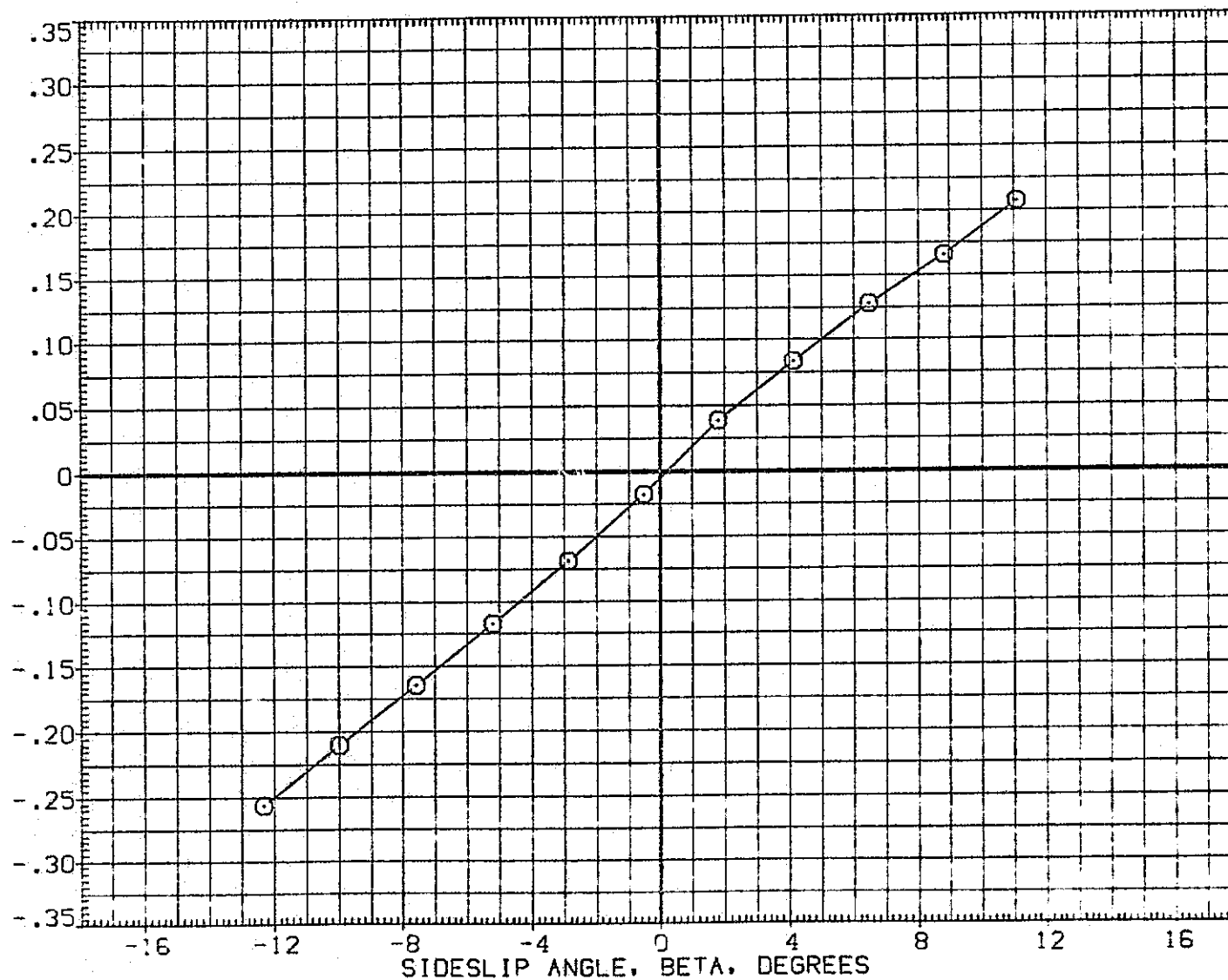


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(D)MACH = 1.05

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(AIC008) □ MSFC 594(1A33) 740TS (TIPISIP201)
 (AIC009) □ MSFC 594(1A33) 740TS (TIPISIP201)
 (AIC010) ◇ MSFC 594(1A33) 740TS (TIPISIP201)

ORR STING ALPHA
 ORR STING .000
 ORR STING 5.000
 ORR STING -5.000

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

YAWING MOMENT COEFFICIENT, CYN

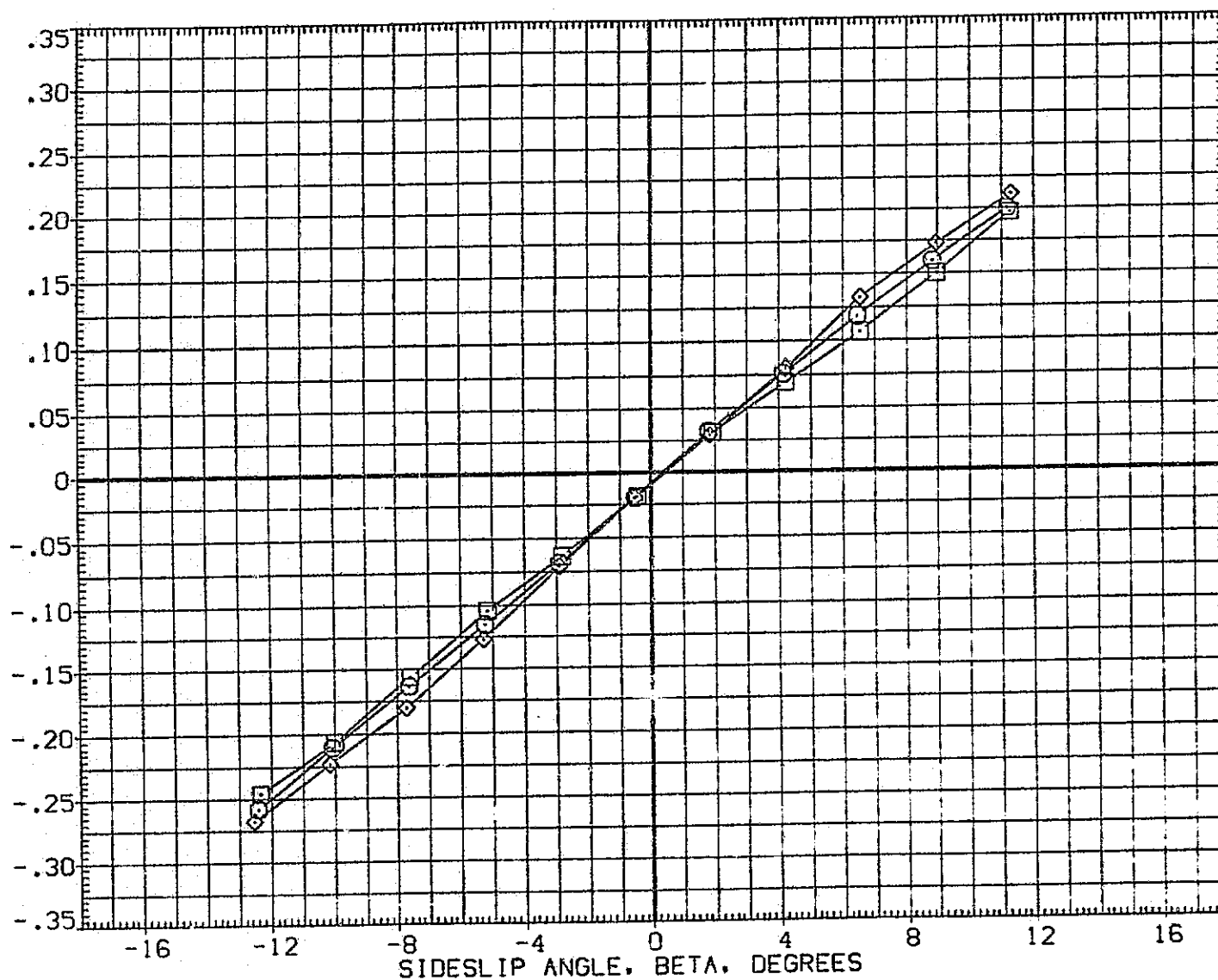


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIG STING	ALPHA
(AIC008)	MSFC S94(1A33) 740TS (TIPISIP201)	ORIG STING	.000
(AIC009)	MSFC S94(1A33) 740TS (TIPISIP201)	ORIG STING	5.000
(AIC010)	MSFC S94(1A33) 740TS (TIPISIP201)	ORIG STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
AMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

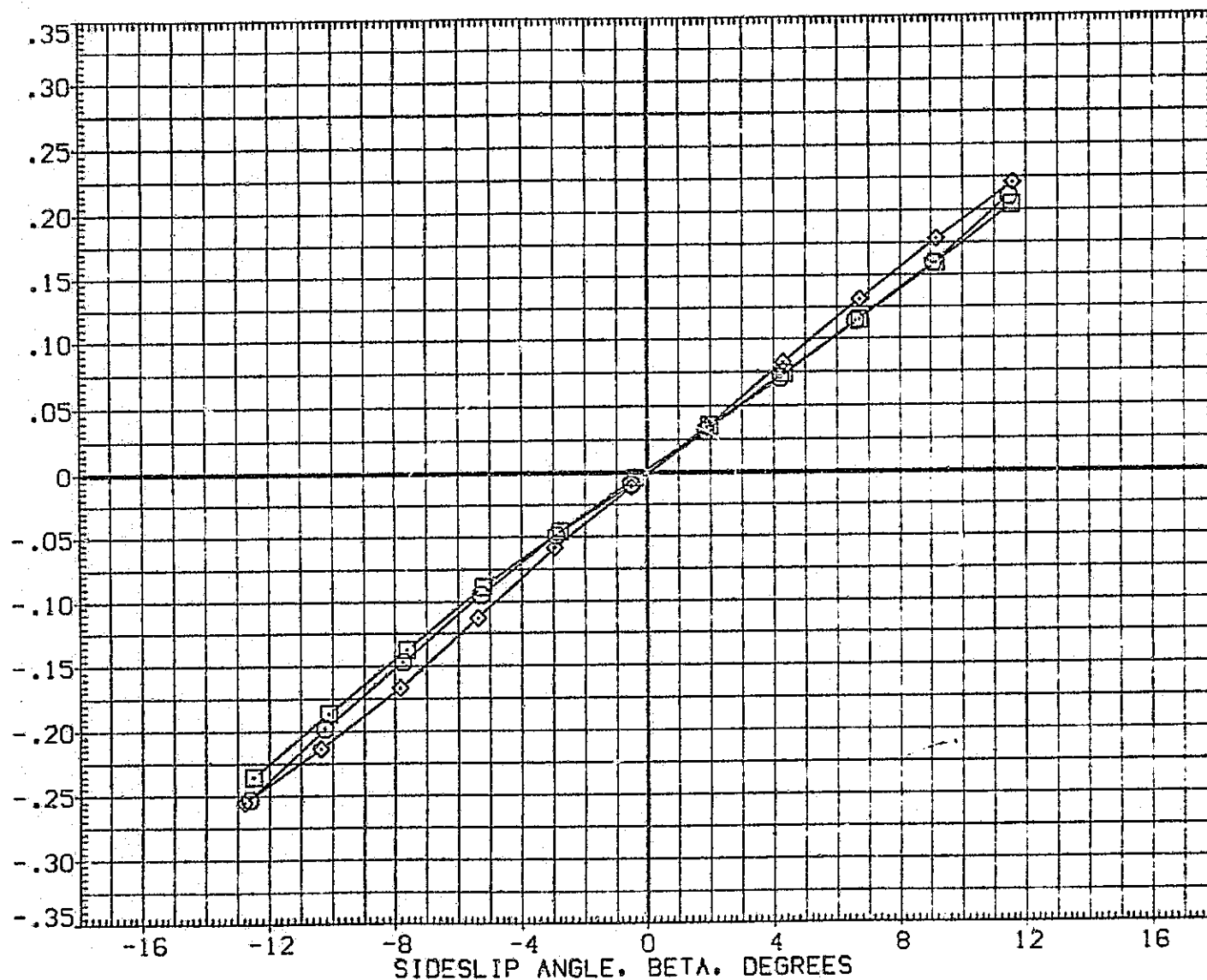


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(F)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
(AIC008)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING	.000
(AIC009)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING	5.000
(AIC010)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. YT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

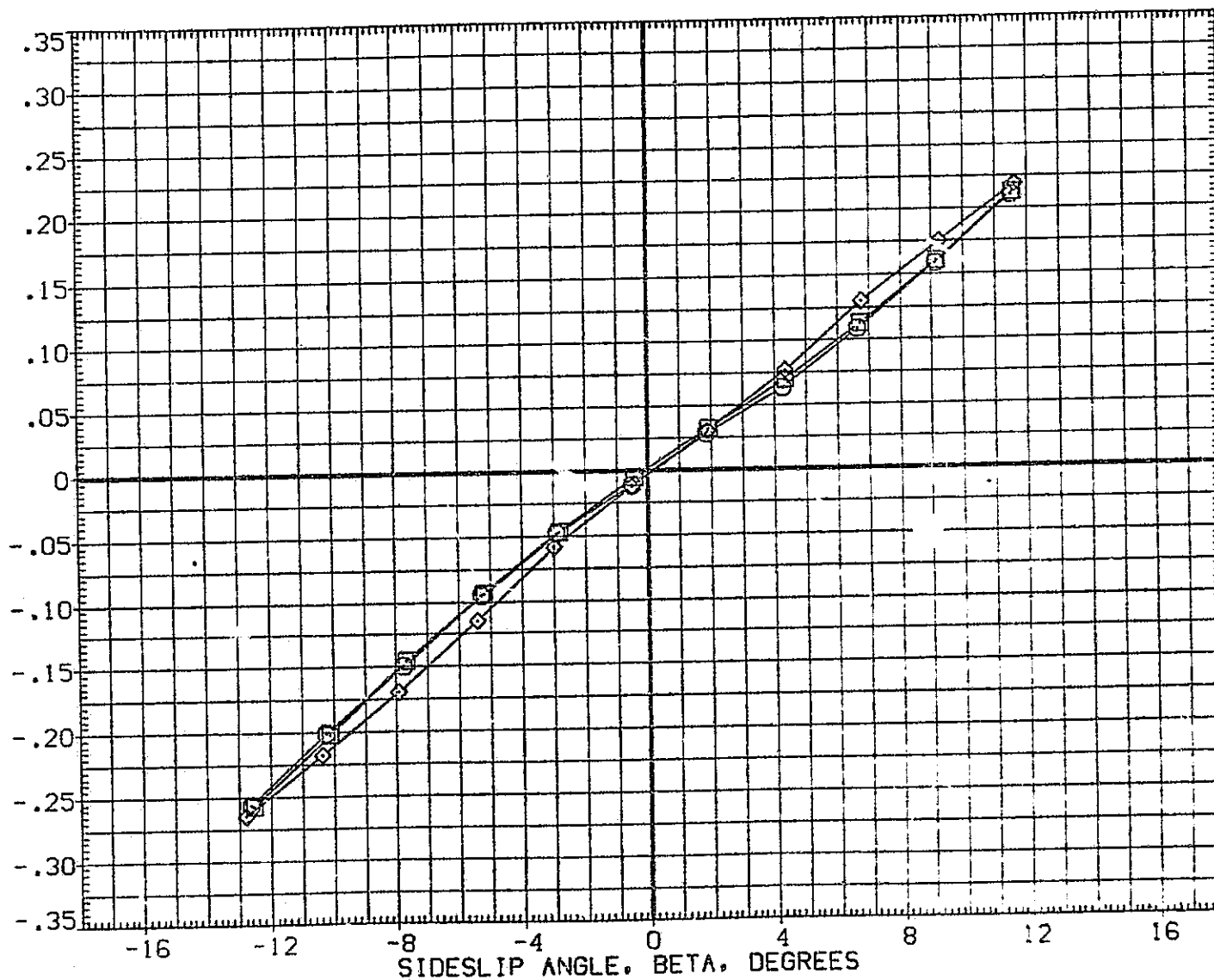


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(G)PACH = 1.47

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
(A1C008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	.000
(A1C009)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	5.000
(A1C010)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

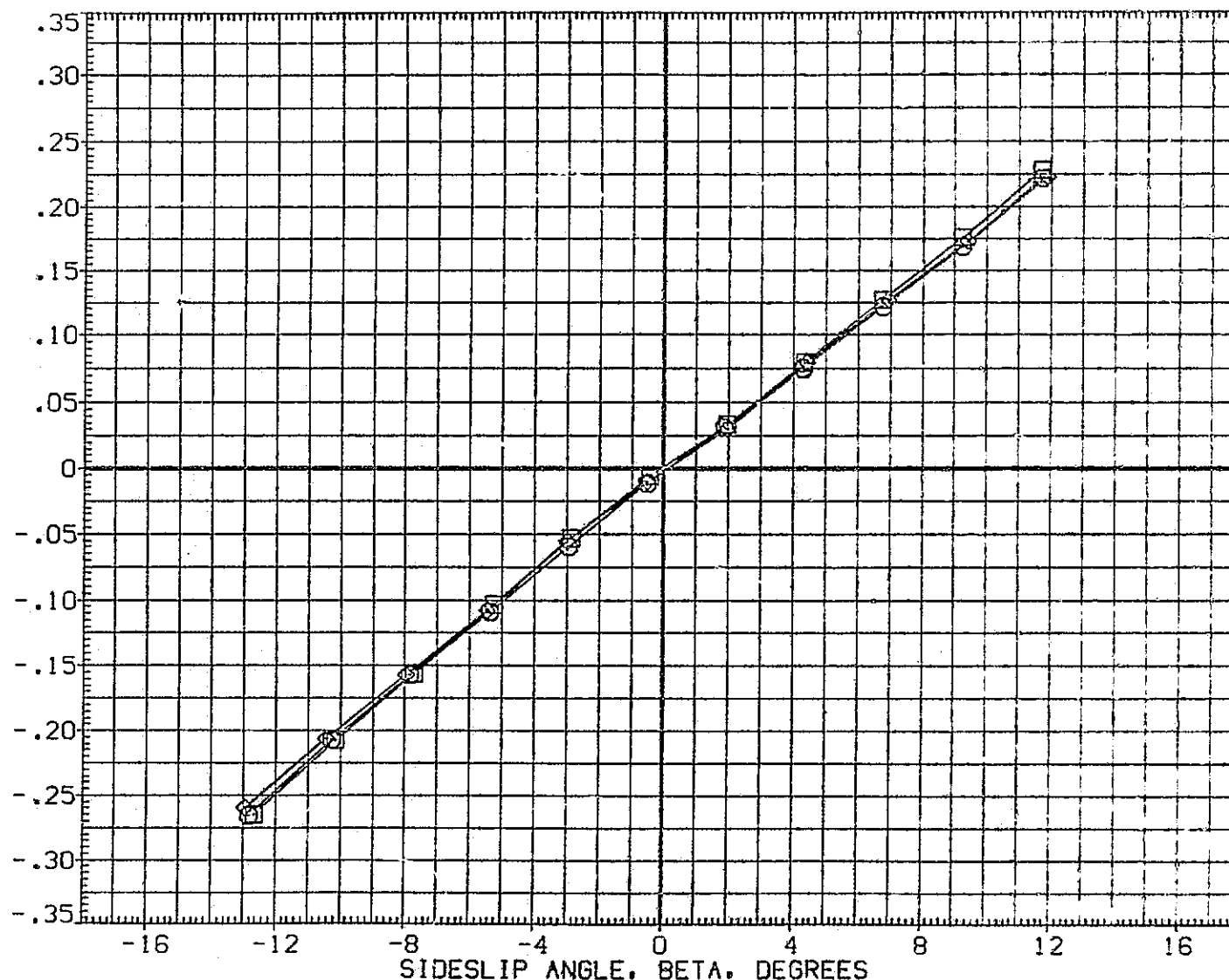


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(H)MACH = 1.97

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
(AIC008)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING	.000
(AIC009)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING	5.000
(AIC010)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

YAWING MOMENT COEFFICIENT, CYN

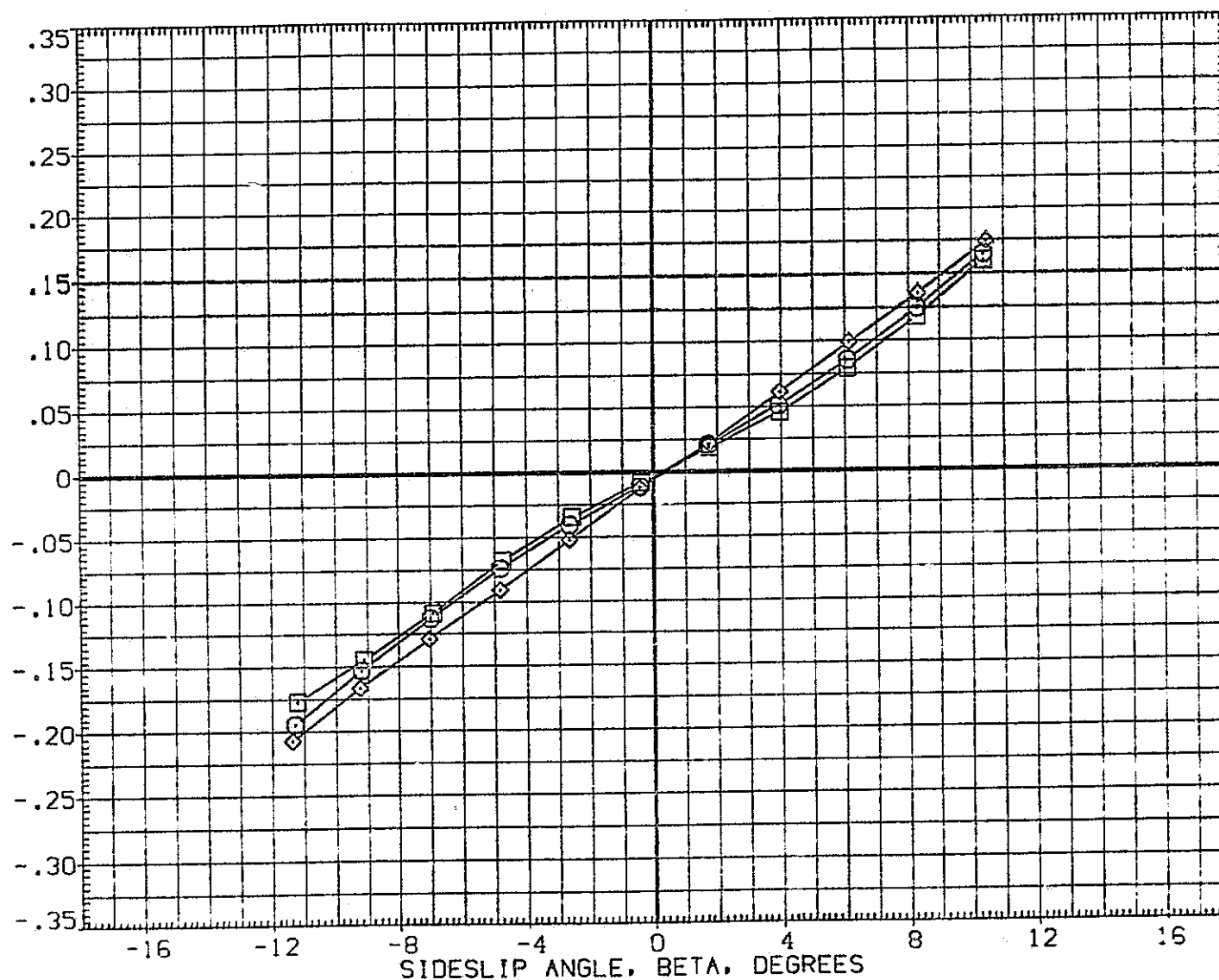


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(1)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008)	MSFC S94(A33) 730TS (TIPISIP201)
(AIC009)	MSFC S94(A33) 740TS (TIPISIP201)
(AIC010)	MSFC S94(A33) 740TS (TIPISIP201)

ORB STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

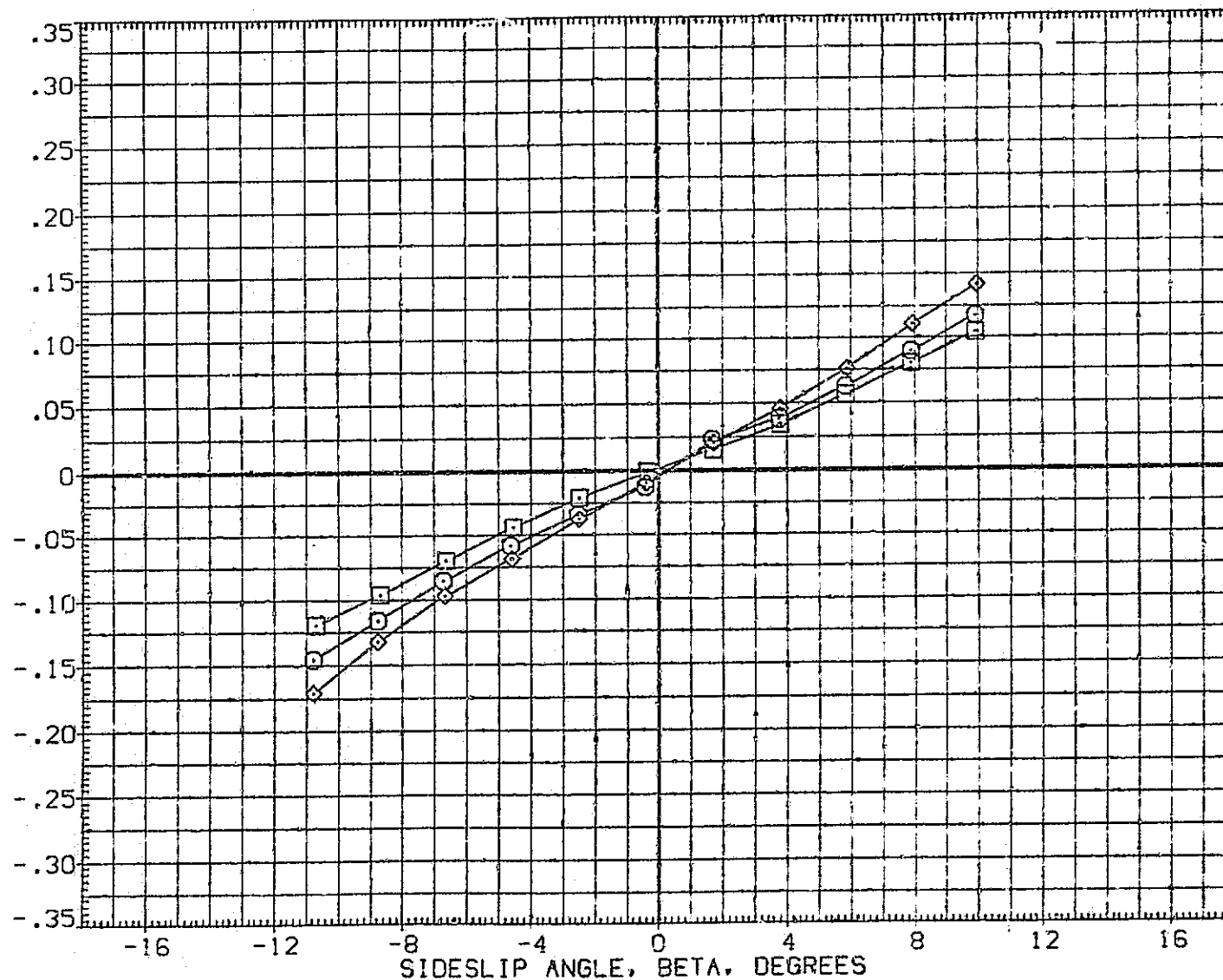


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(J)MACH 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
[AIC008]	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	.000
[AIC009]	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	5.000
[AIC010]	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

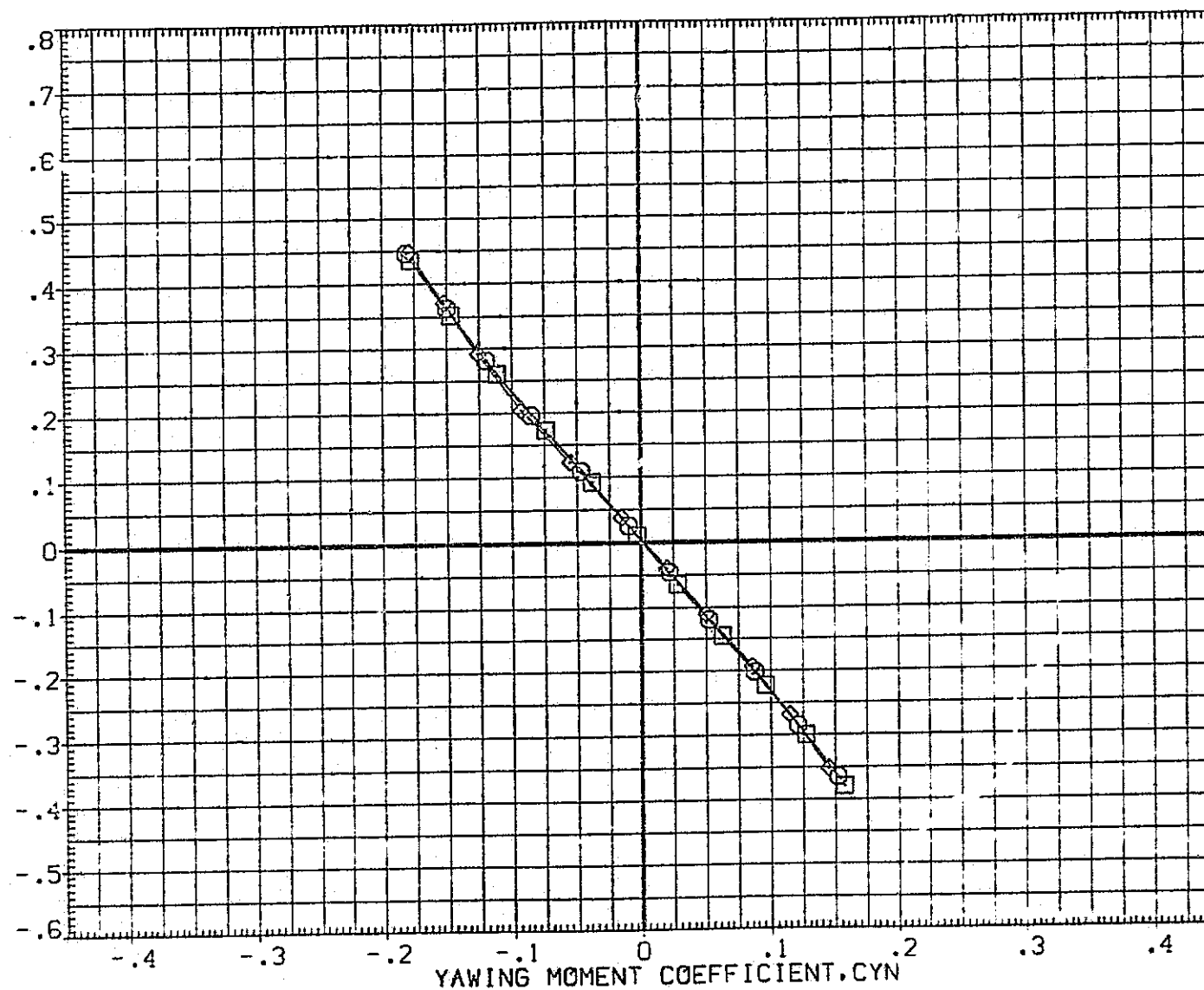


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
(A1C008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	.000
(A1C009)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	5.000
(A1C010)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0740	

SIDE-FORCE COEFFICIENT, CY

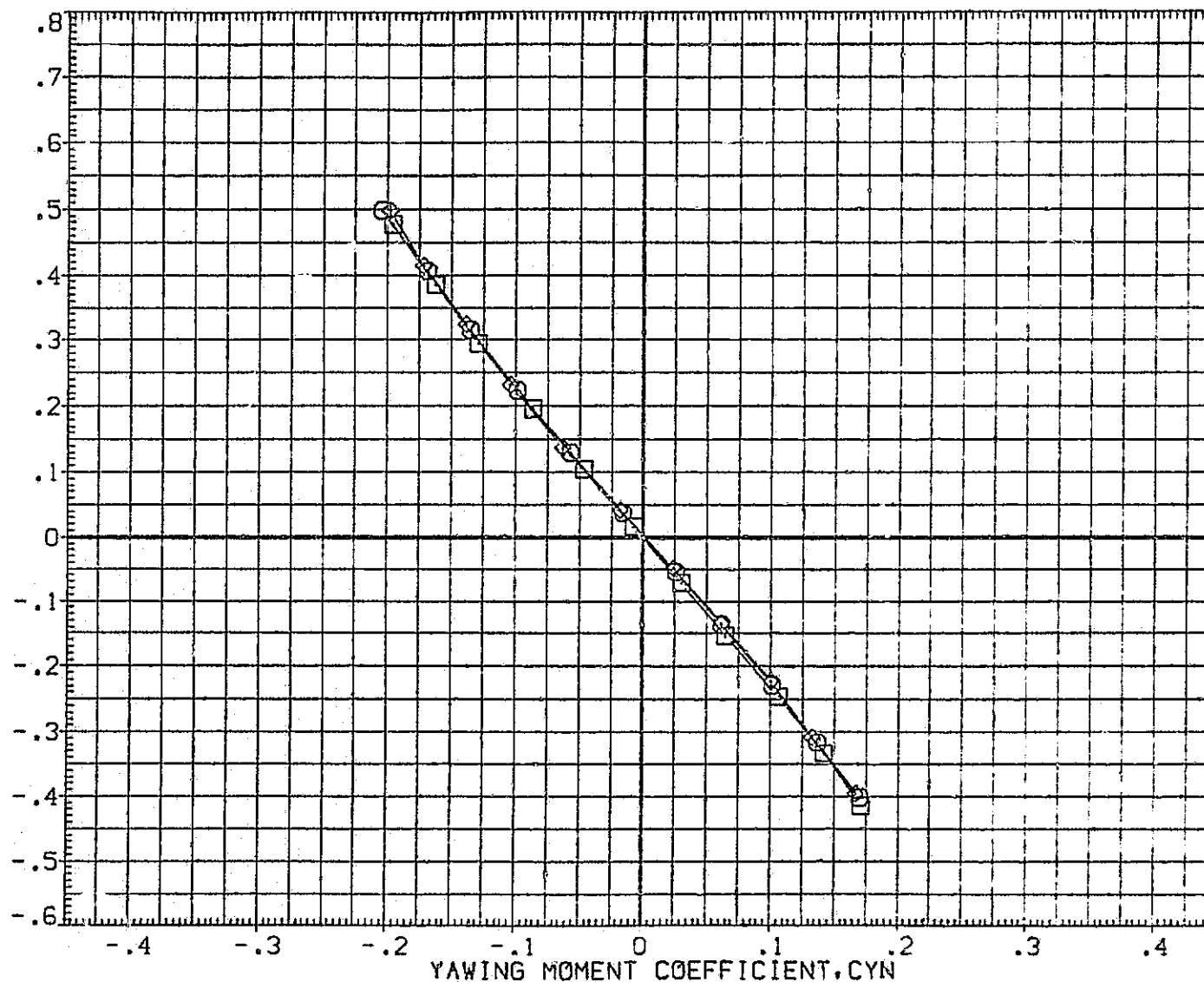


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(B)MACH = .80

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIGIN	ALPHA
{AIC008}	MSFC S94(A33) 740TS (TIPISIP201)	ORB STING	.000
{AIC009}	MSFC S94(A33) 740TS (TIPISIP201)	ORB STING	5.000
{AIC010}	MSFC S94(A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

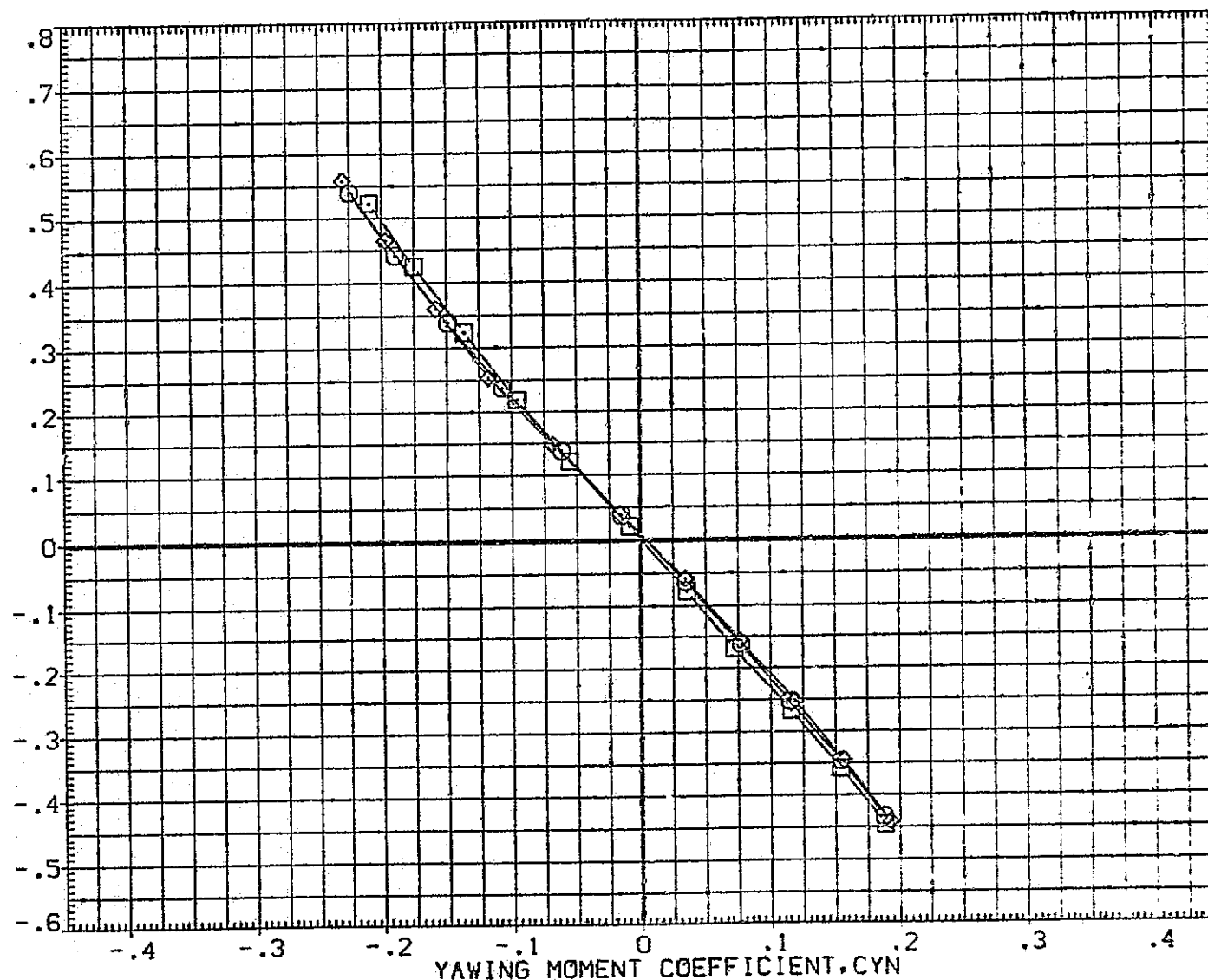


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(A1C008) ○	MSFC 594(1A33) 740TS (TIPISIP201)	
(A1C009) □	DATA NOT AVAILABLE	
(A1C010) ◇	DATA NOT AVAILABLE	

ALPHA
 .000
 5.000
 -5.000

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

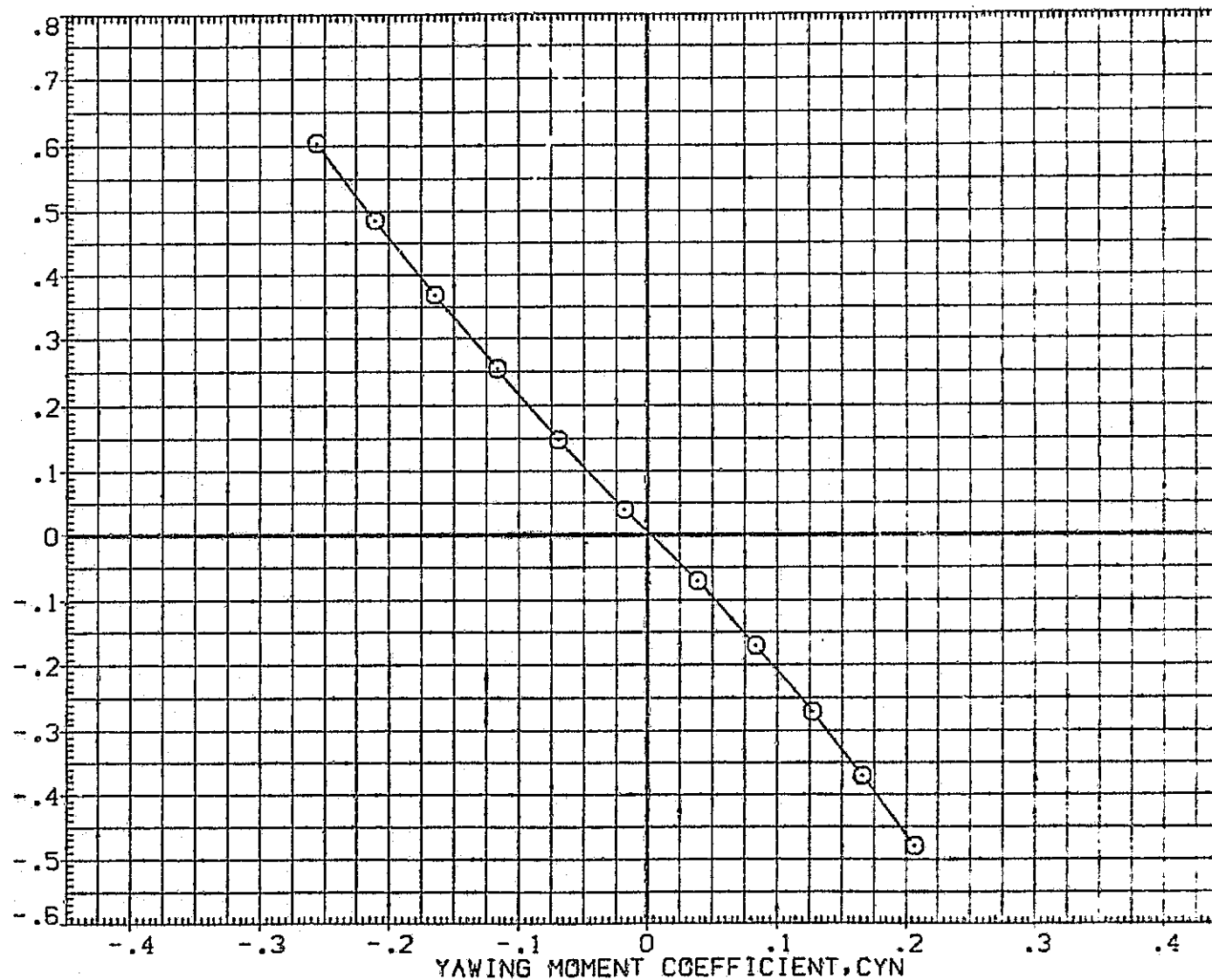


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
 (CD)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C008)	MSFC 594(1A33) 740TS (TIPISIP201)
(A1C009)	MSFC 594(1A33) 740TS (TIPISIP201)
(A1C010)	MSFC 594(1A33) 740TS (TIPISIP201)

ORBITAL STING	ALPHA
ORBITAL STING	.000
ORBITAL STING	5.000
ORBITAL STING	10.000

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

SIDE-FORCE COEFFICIENT, CY

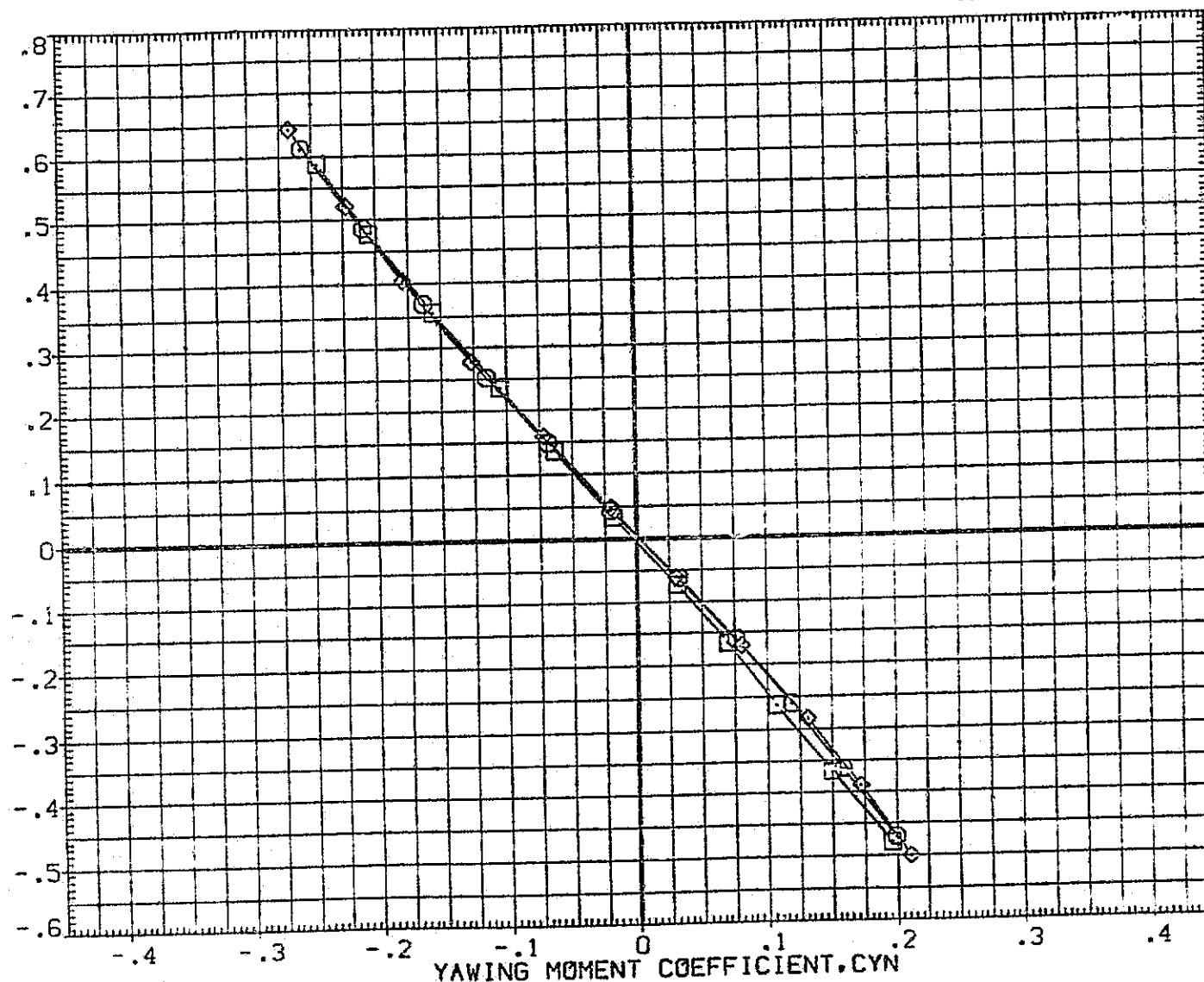


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

COMACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA
(A1C008)	MSFC S94((A33) 740TS (TIPISIP201)	ORB STING .000
(A1C009)	MSFC S94((A33) 740TS (TIPISIP201)	ORB STING 5.000
(A1C010)	MSFC S94((A33) 740TS (TIPISIP201)	ORB STING -5.000

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

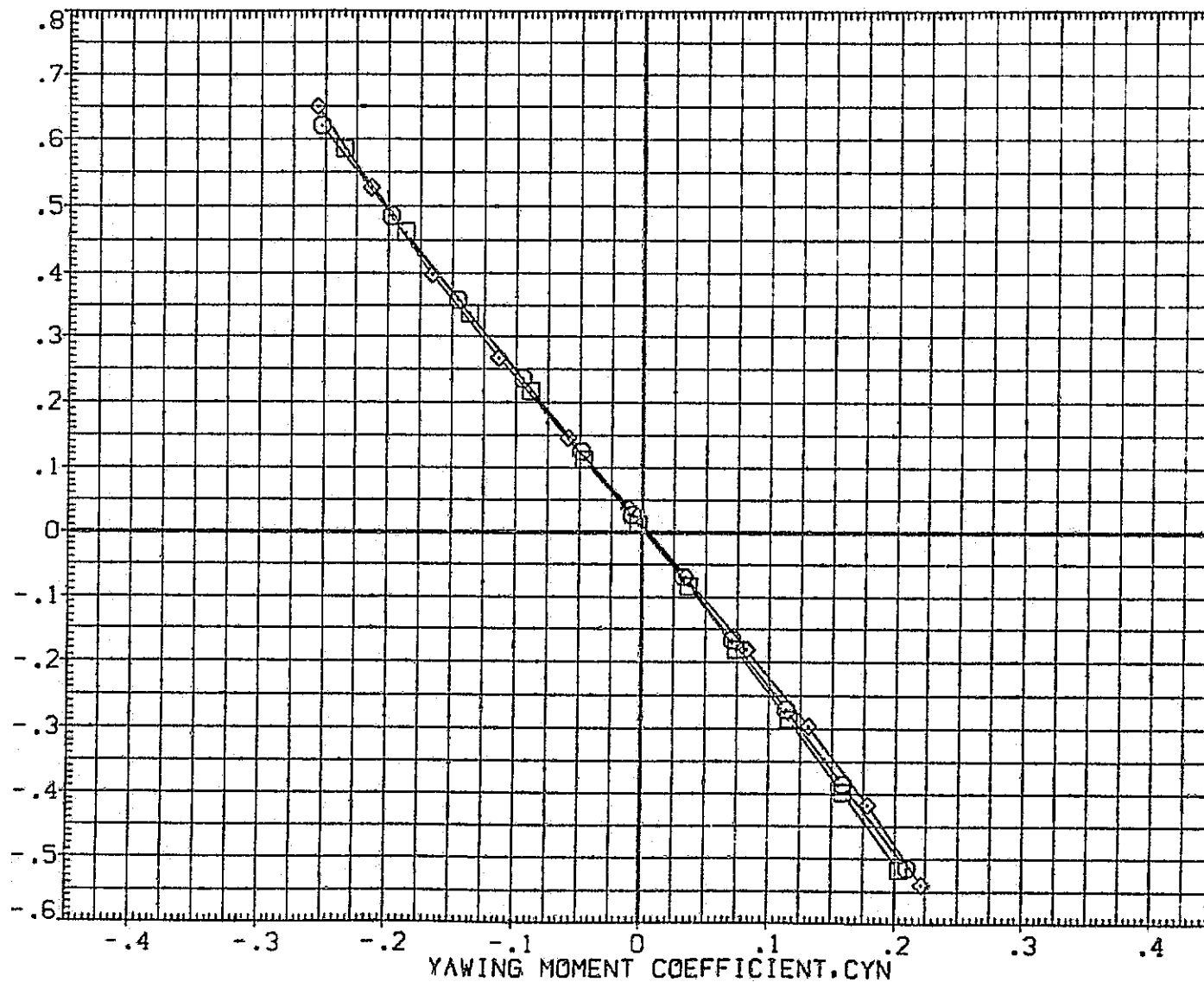


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(F)MACH 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
(A1C008)	MSFC S94(1A33) 740TS (TIPISIP201)	ORB STING	.000
(A1C009)	MSFC S94(1A33) 740TS (TIPISIP201)	ORB STING	5.000
(A1C010)	MSFC S94(1A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

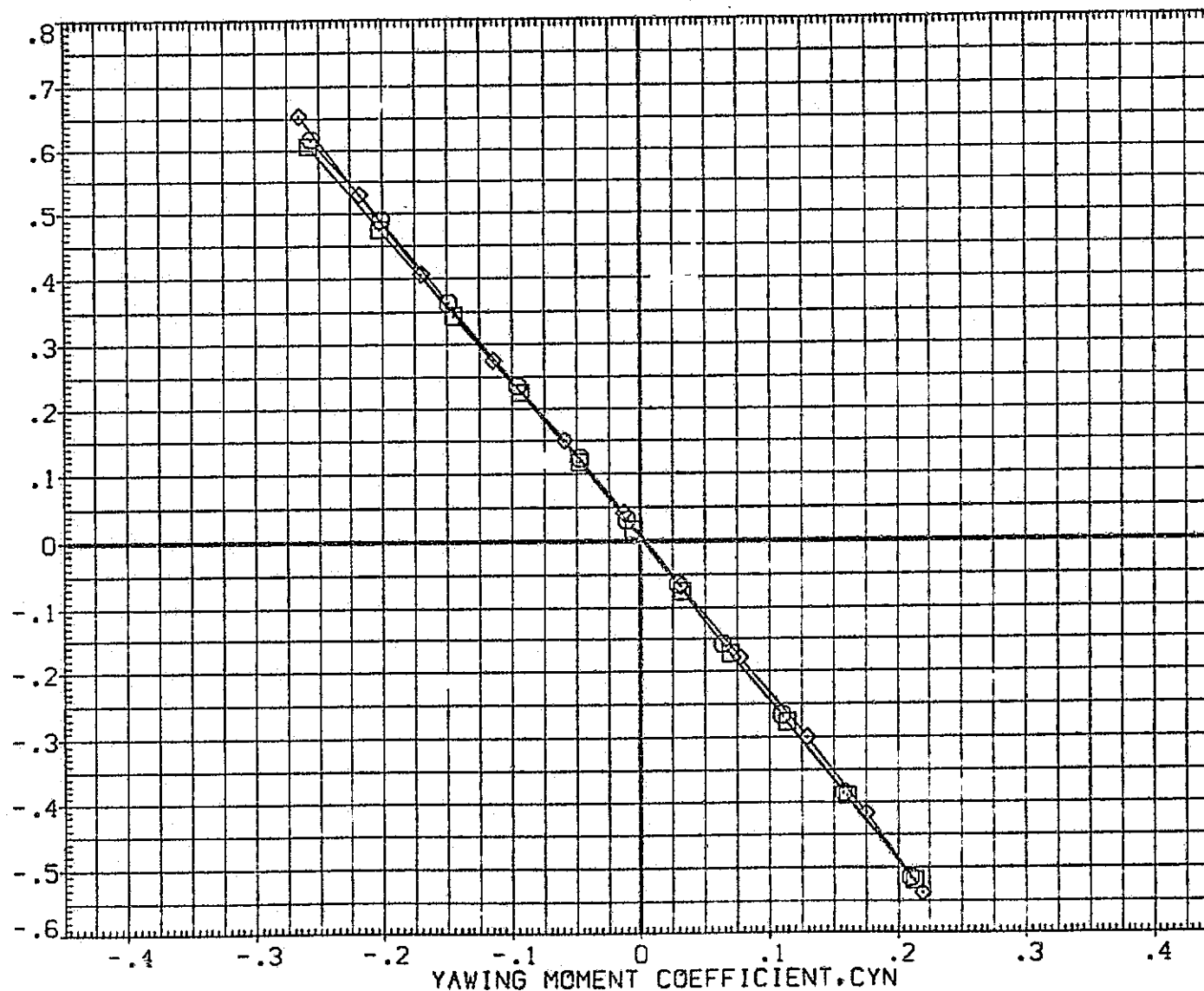


FIG 7 LAUNCH VEHICLE FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(G)MACH = 1.47

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C008)	MSFC 594(A33) 740TS (TIPISIP201)
(A1C009)	MSFC 594(A33) 740TS (TIPISIP201)
(A1C010)	MSFC 594(A33) 740TS (TIPISIP201)

ORB STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

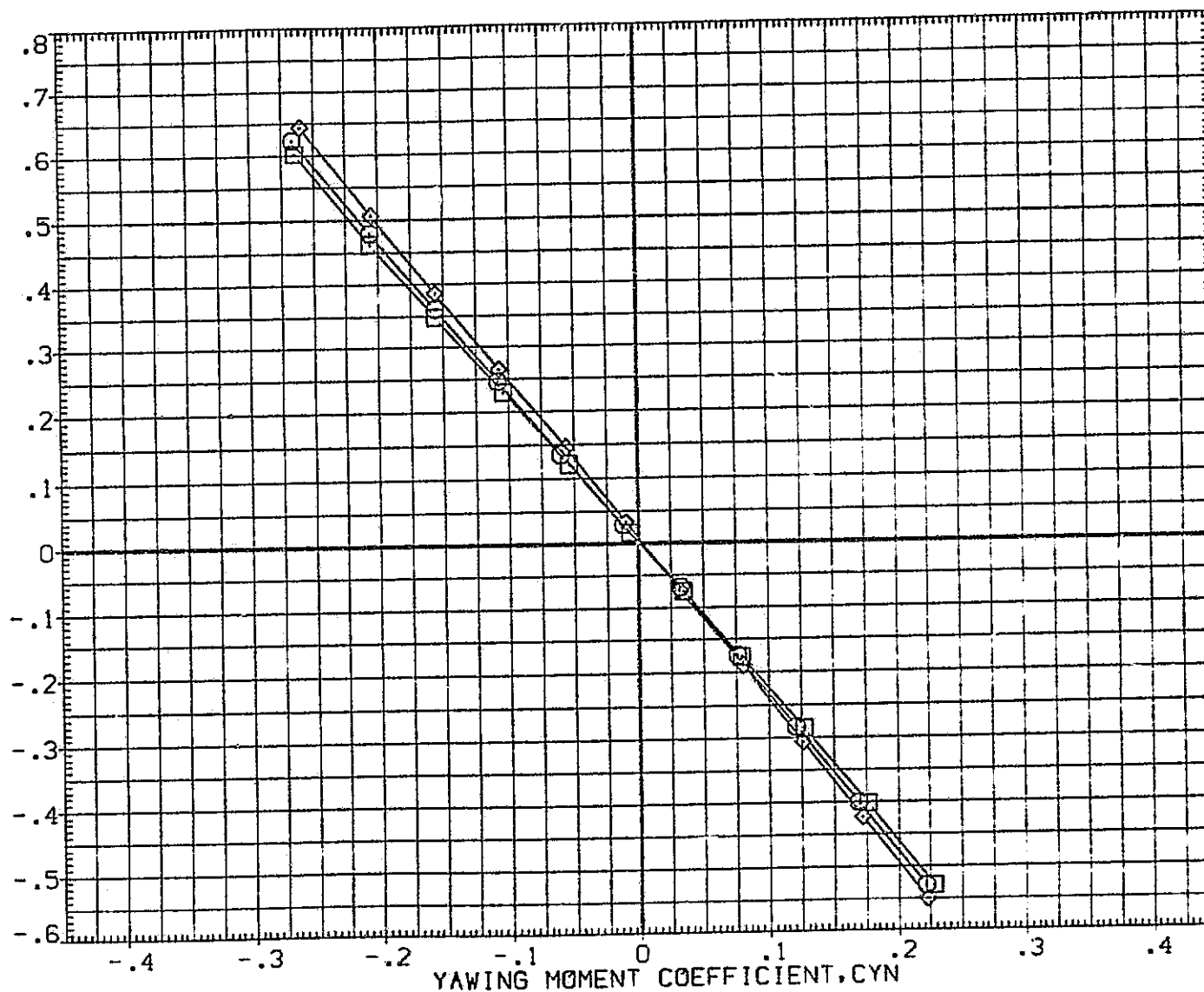


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(H)MACH = 1.97

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C008)	MSF: S94(1A33) 740TS (TIPISIP201)
(A1C009)	MSF: S94(1A33) 740TS (TIPISIP201)
(A1C010)	MSF: S94(1A33) 740TS (TIPISIP201)

ORBITAL STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

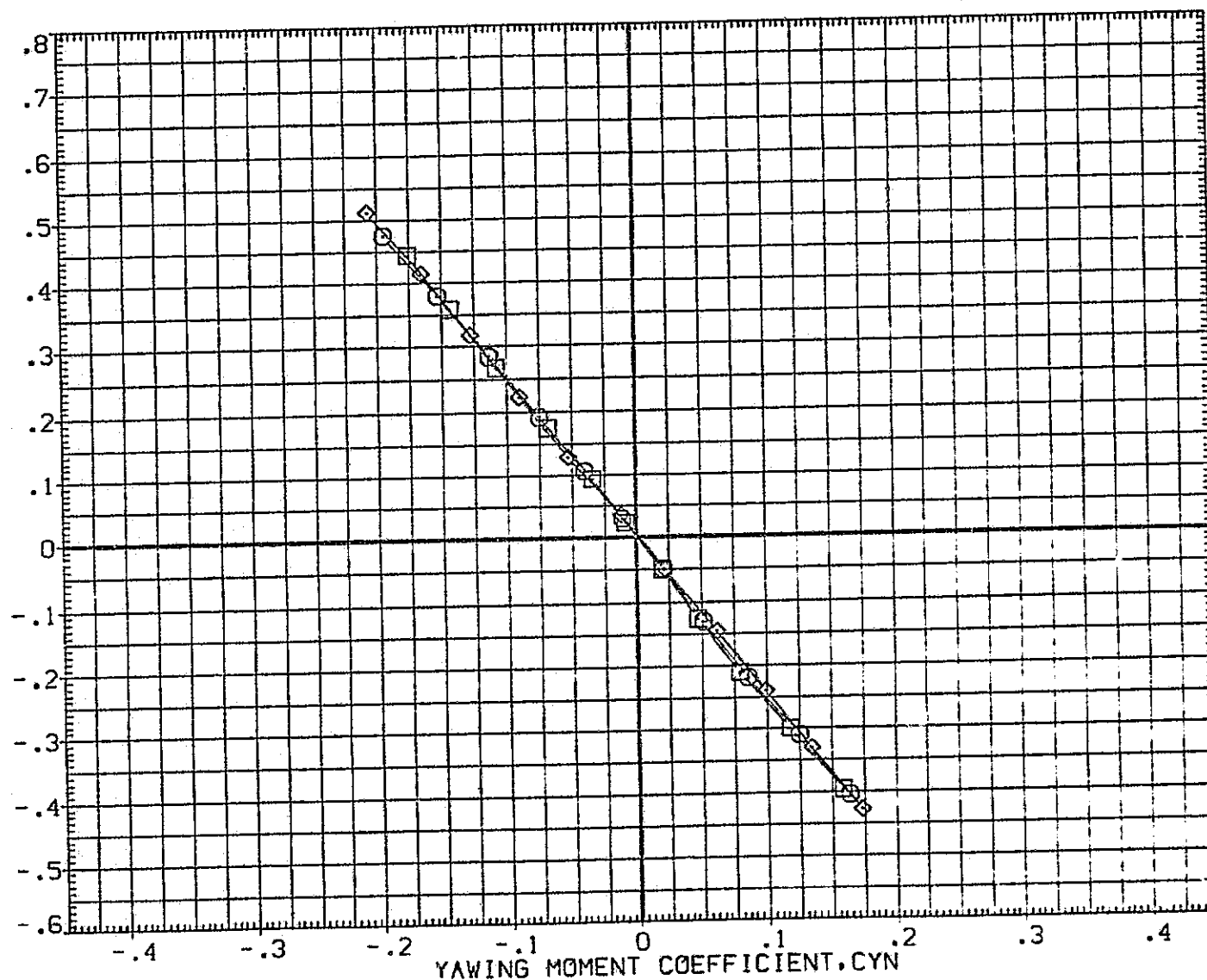


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
 (1)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORBIT	ALPHA	REFERENCE INFORMATION
(A1C008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING	.000	SREF 2690.0000 SQ. FT
(A1C009)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING	5.000	LREF 1290.0000 IN.
(A1C010)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING	-5.000	BREF 1290.0000 IN.
				XMRP 976.0000 IN. XT
				YMRP .0000 IN. YT
				ZMRP 400.0000 IN. ZT
				SCALE .0040

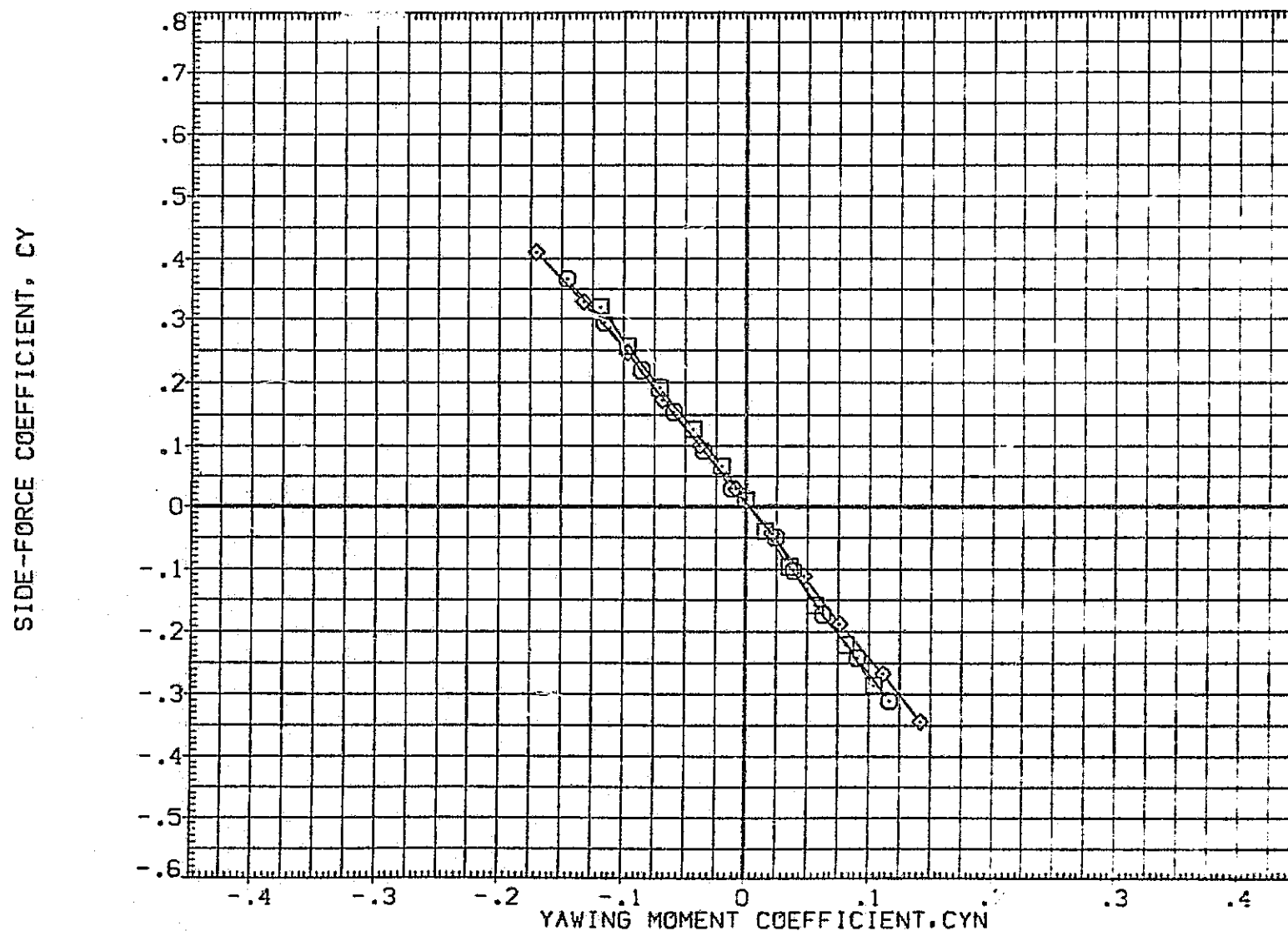


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008)	MSFC 594(A33) 740TS (TIPISIP201)
(VIC009)	MSFC 594(A33) 740TS (TIPISIP201)
(VIC010)	MSFC 594(A33) 740TS (TIPISIP201)

ORBITAL STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1250.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

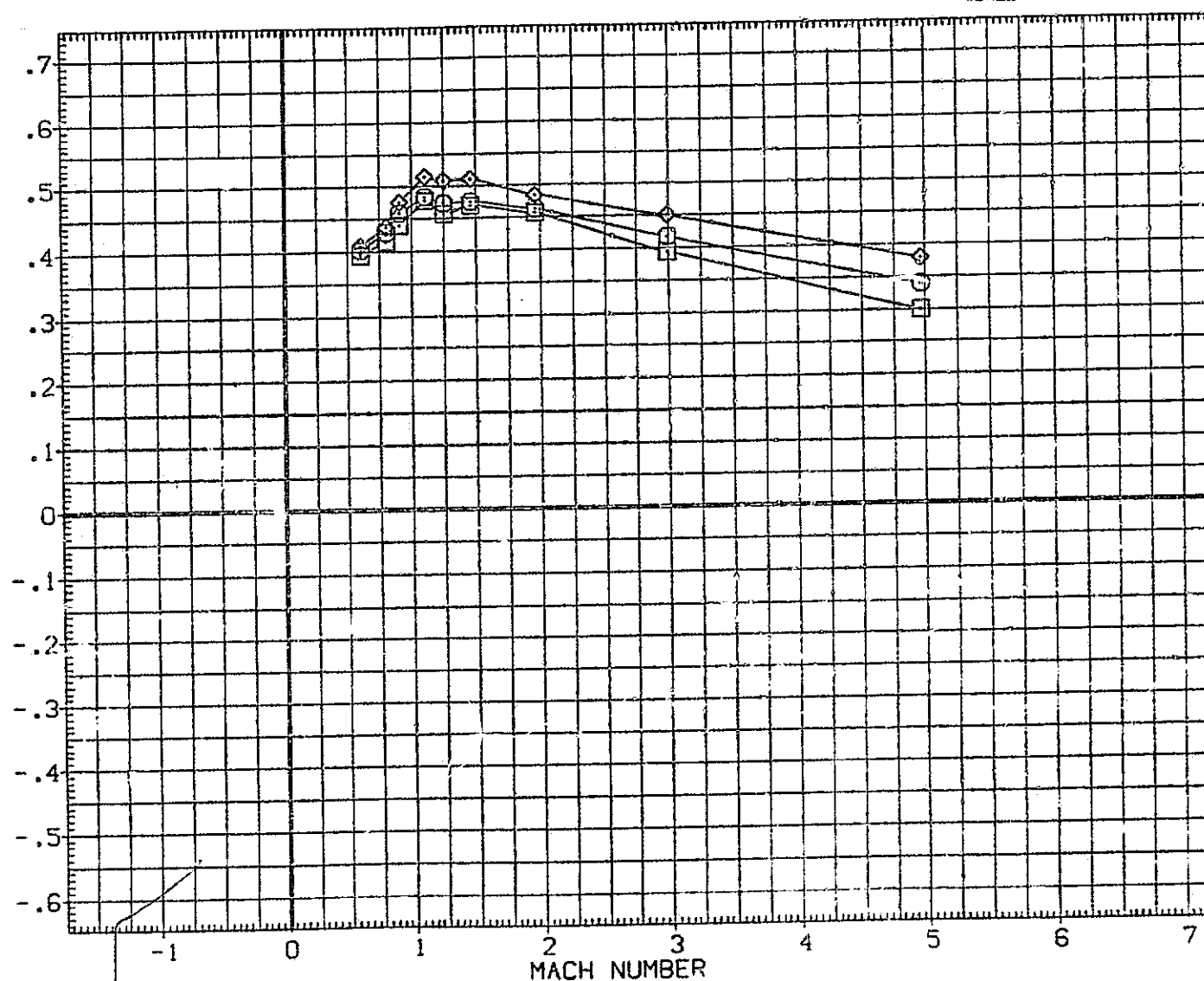


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(A) BETA = -10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008)	MSFC 594(1A33) 740TS (TIPISIP201)
(VIC009)	MSFC 594(1A33) 740TS (TIPISIP201)
(VIC010)	MSFC 594(1A33) 740TS (TIPISIP201)

ORB STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

SIDE-FORCE COEFFICIENT, CY

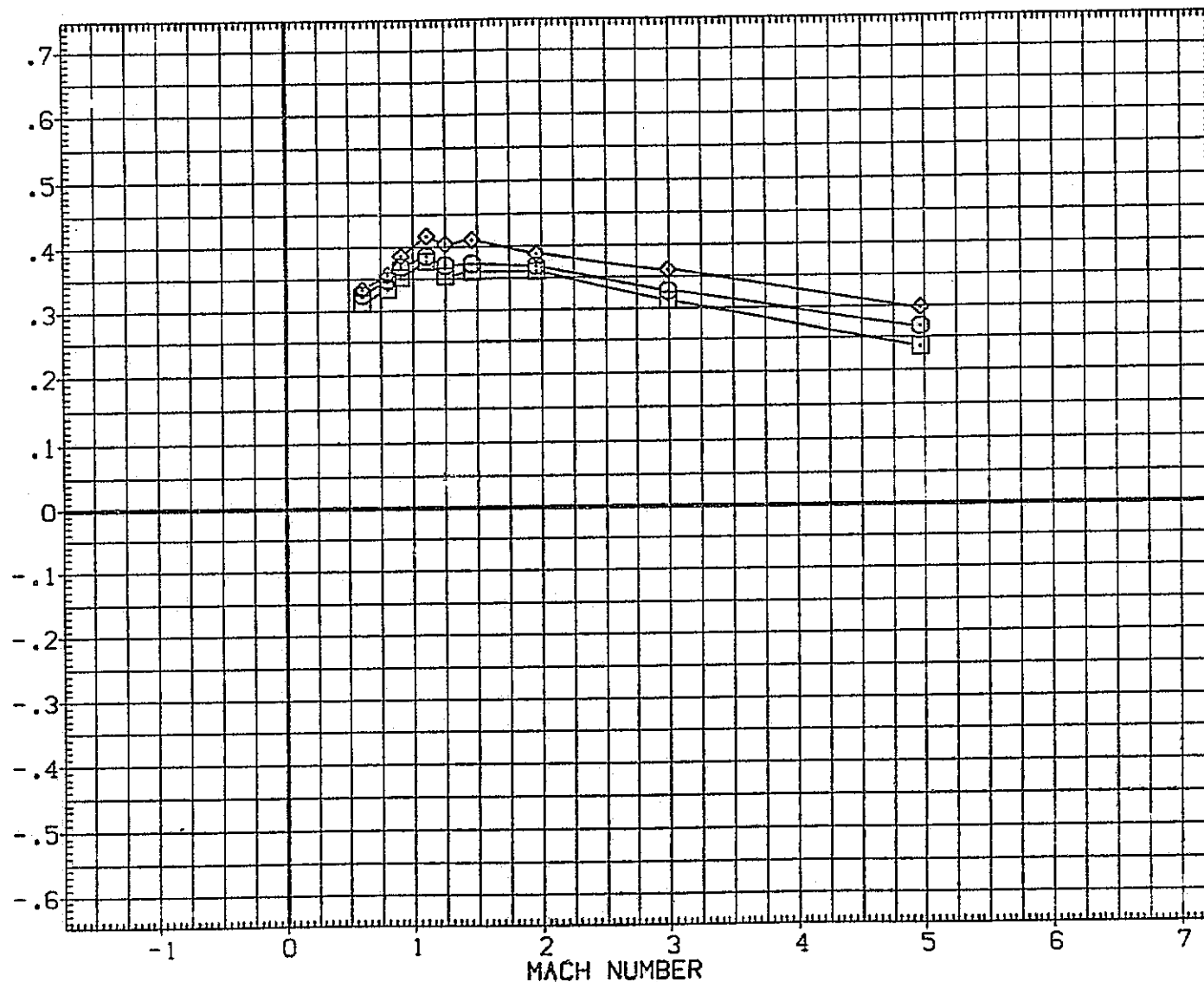





FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(B)BETA = -8.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC008)  MSFC 594(1A33) 740TS (TIPISIP201)
 (VIC009)  MSFC 594(1A33) 740TS (TIPISIP201)
 (VIC010)  MSFC 594(1A33) 740TS (TIPISIP201)

ORB STING
 ORB STING
 ORB STING

ALPHA
 .000
 5.000
 -5.000

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SIDE-FORCE COEFFICIENT, CY

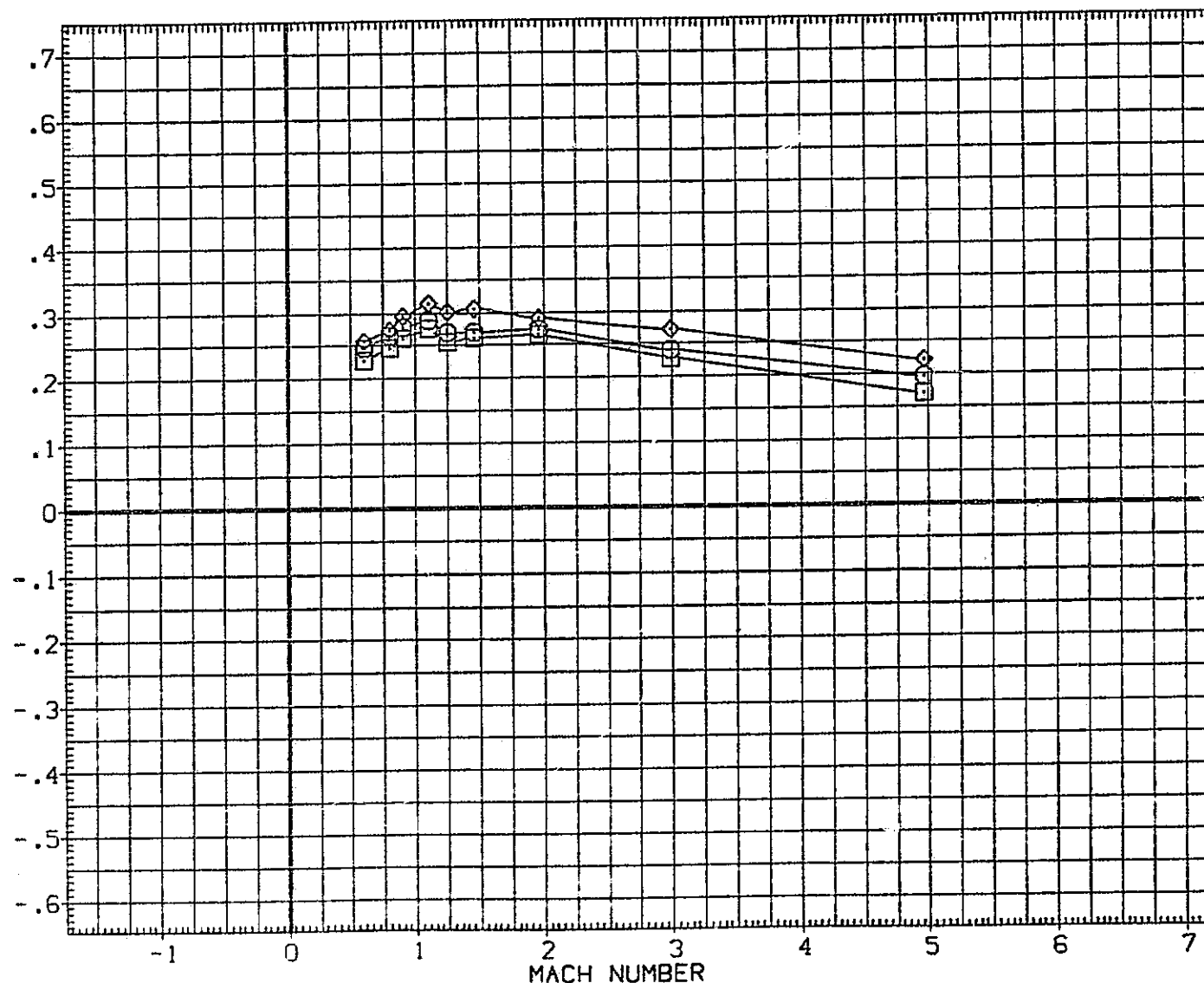


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(C)BETA = -6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
(VIC008)	MSFC 594(I A33) 740TS (TIP)SIP201)	ORB STING	.000
(VIC009)	MSFC 594(I A33) 740TS (TIP)SIP201)	ORB STING	5.000
(VIC010)	MSFC 594(I A33) 740TS (TIP)SIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

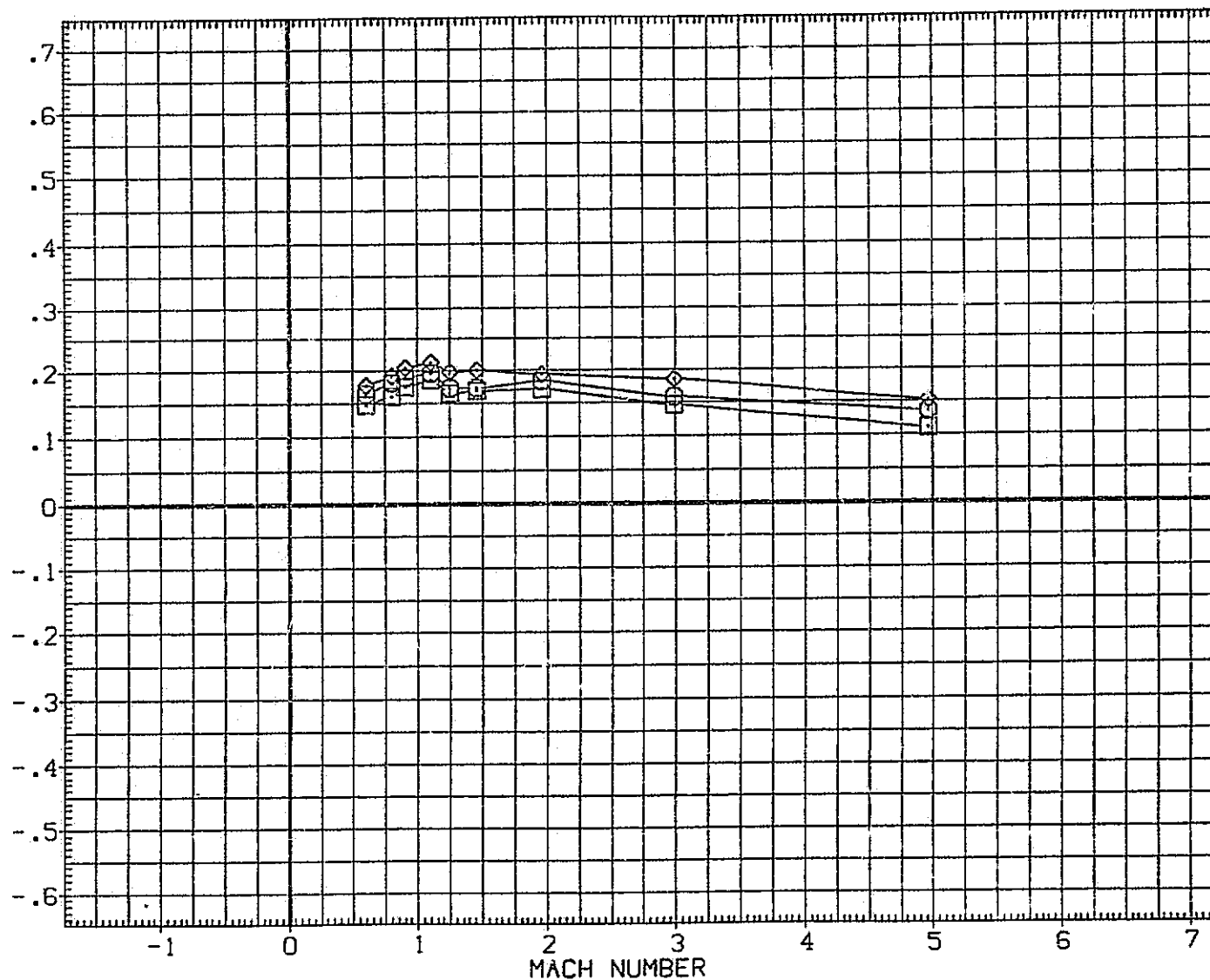


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(D)BETA = -4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VICO08)	MSFC 594(1A33) 740TS (TIPISIP201)
(VICO09)	MSFC 594(1A33) 740TS (TIPISIP201)
(VICO10)	MSFC 594(1A33) 740TS (TIPISIP201)

ORB STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

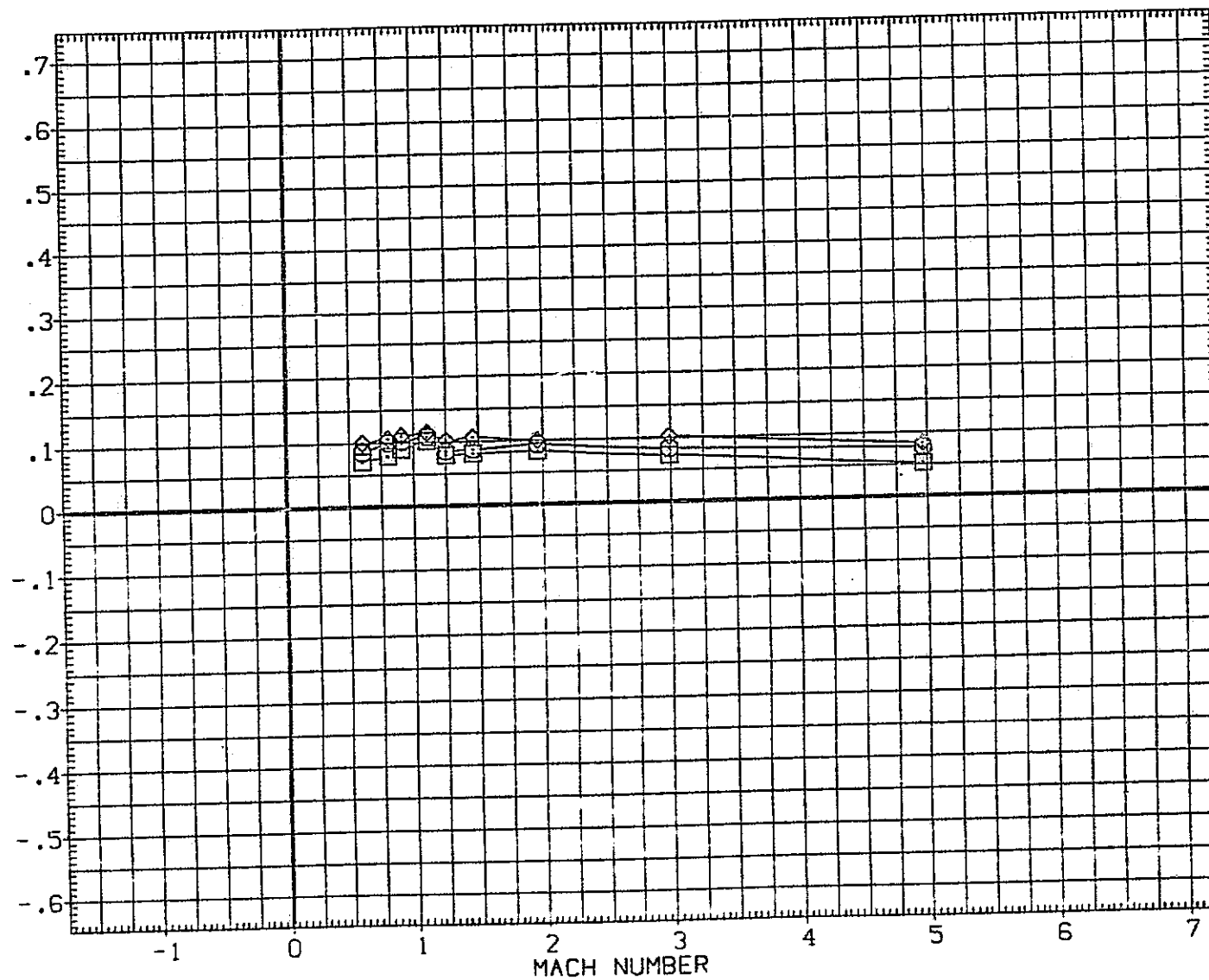





FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(E)BETA = -2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008) 	MSFC 594(1A33) 740TS (TIP1SIP201)
(VIC009) 	MSFC 594(1A33) 740TS (TIP1SIP201)
(VIC010) 	MSFC 594(1A33) 740TS (TIP1SIP201)

ORBIT	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN. IN.
BREF	1290.0000	IN. IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

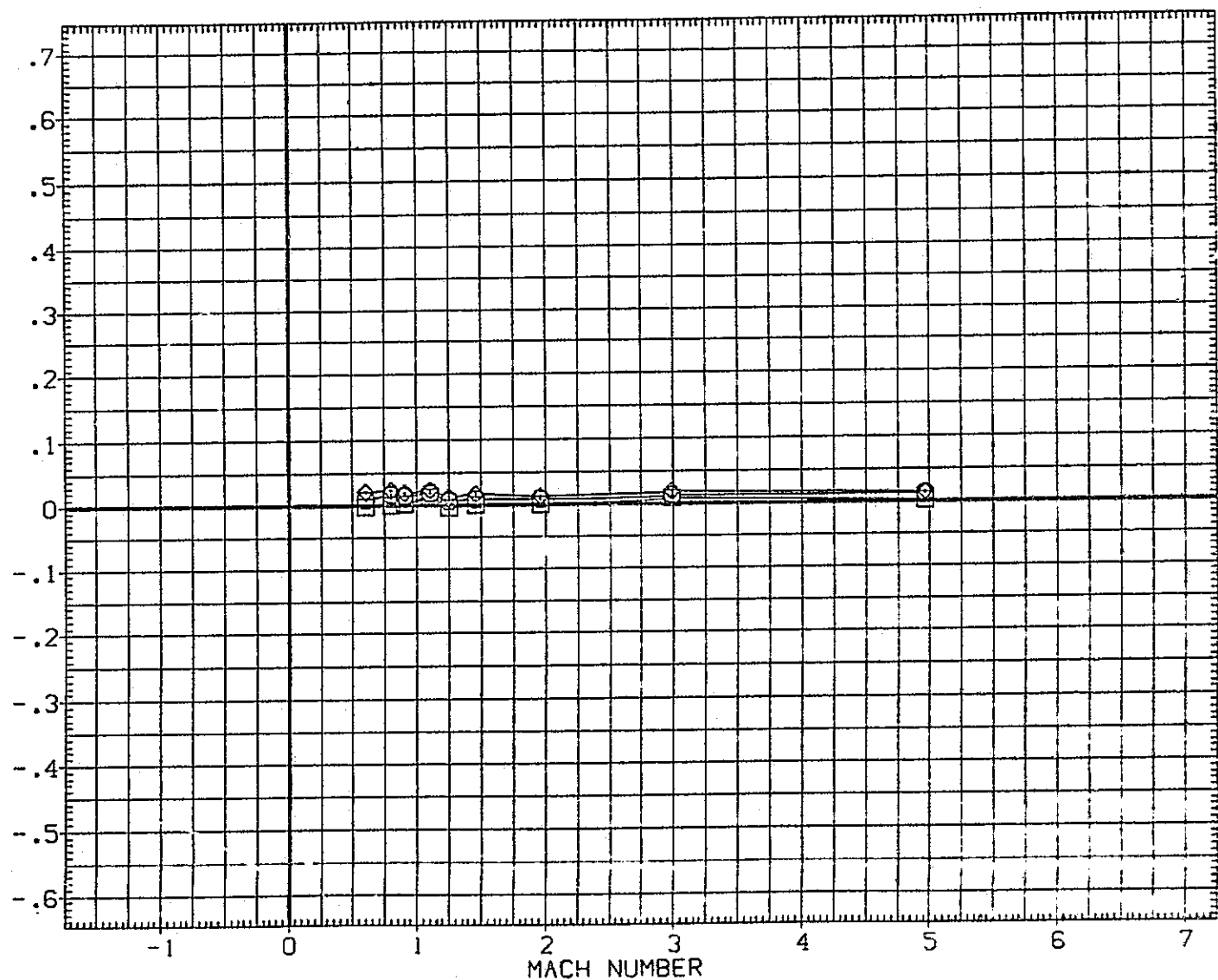


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(F)BETA = .00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)
(VIC009)	MSFC 594(1A33) 740TS (T1P1S1P201)
(VIC010)	MSFC 594(1A33) 740TS (T1P1S1P201)

ALPHA
ORB STING .000
ORB STING 5.000
ORB STING -5.000

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRF	976.0000 IN. XT
YMRF	.0000 IN. YT
ZMRF	400.0000 IN. ZT
SCALE	.0040

SIDE-FORCE COEFFICIENT, CY

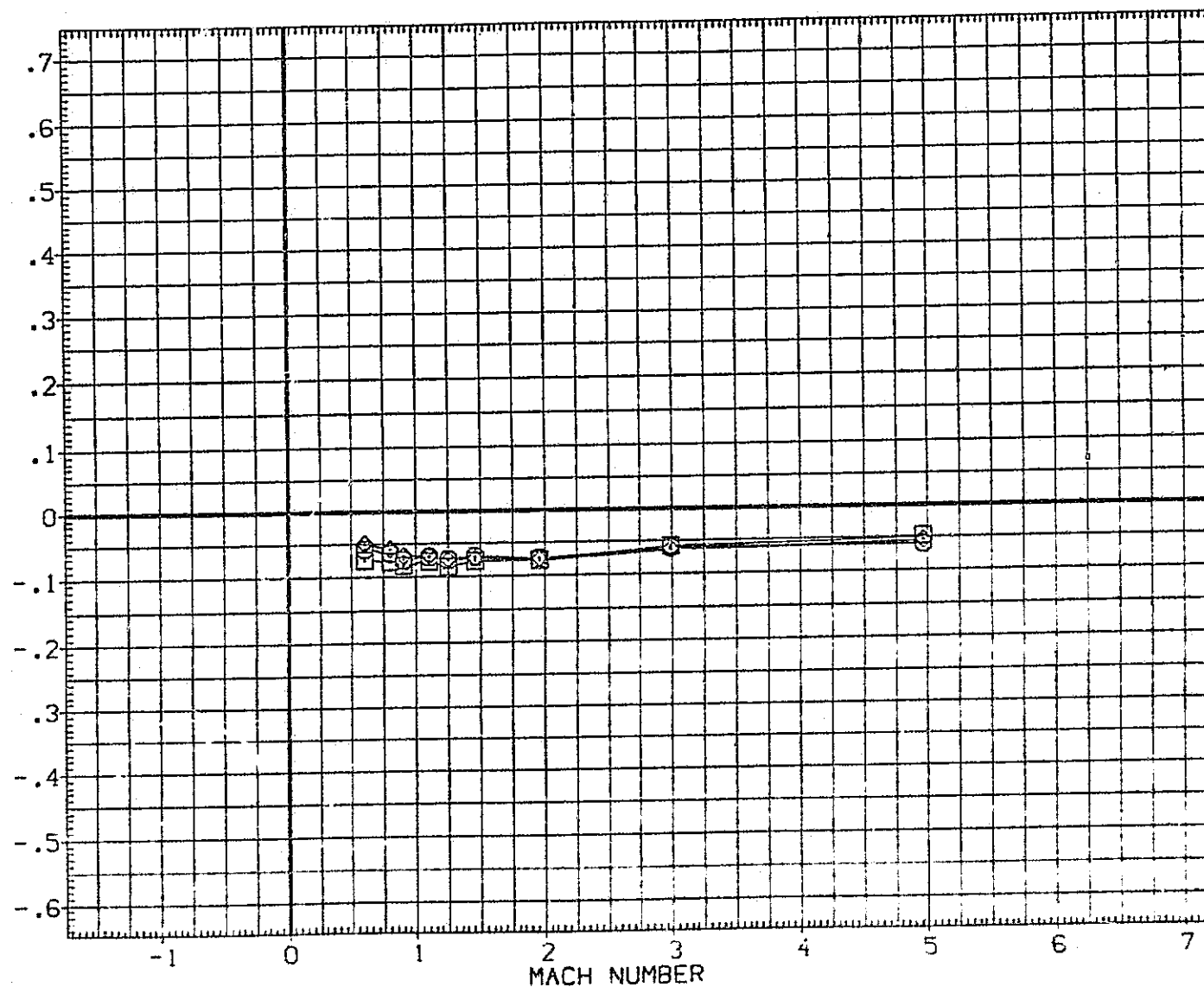


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(S)BETA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
(VIC008)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING	.000
(VIC009)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING	5.000
(VIC010)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
ZMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

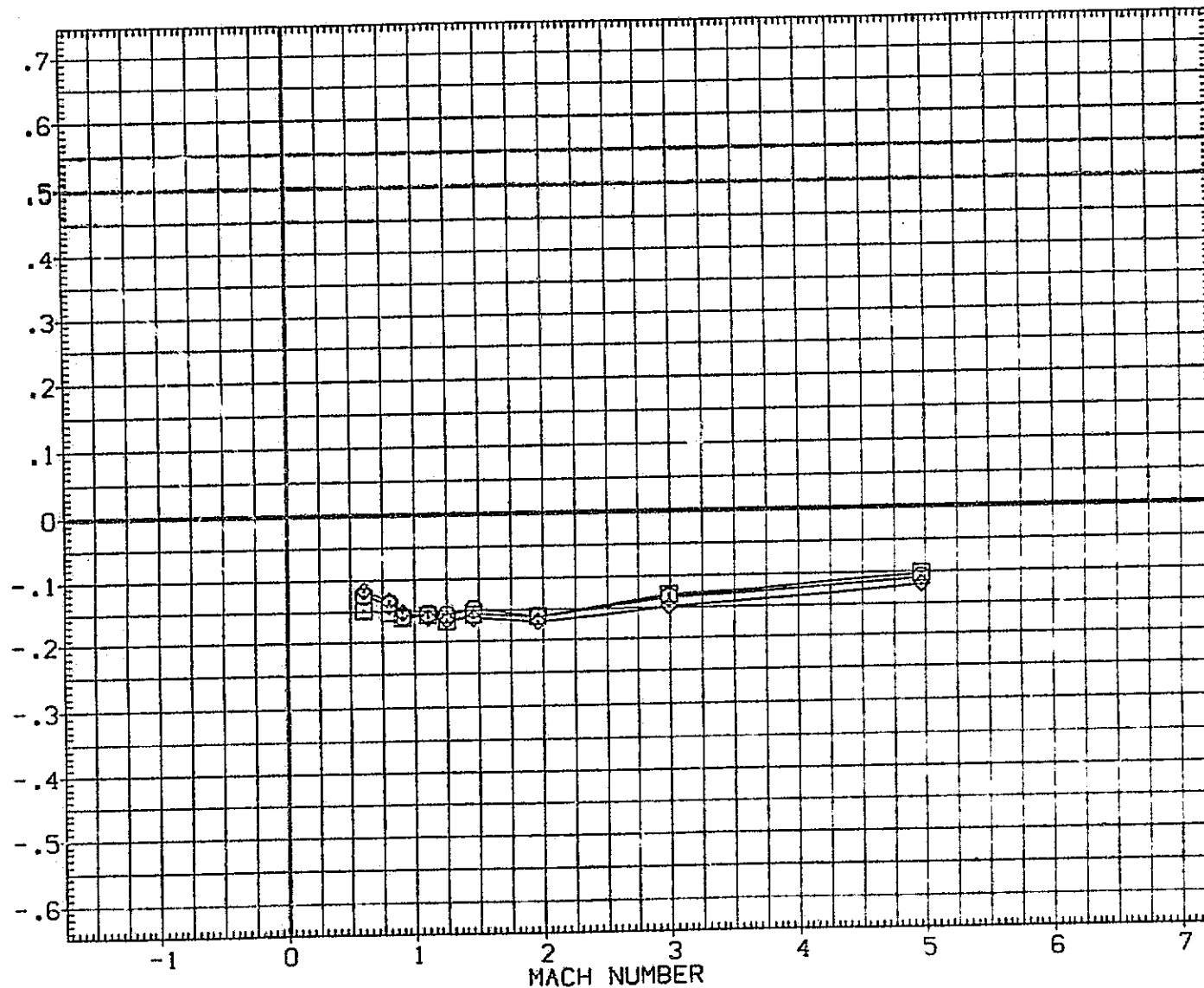


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(H)BETA = 4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)
(VIC009)	MSFC 594(1A33) 740TS (T1P1S1P201)
(VIC010)	MSFC 594(1A33) 740TS (T1P1S1P201)

ORB STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

SIDE-FORCE COEFFICIENT, CY

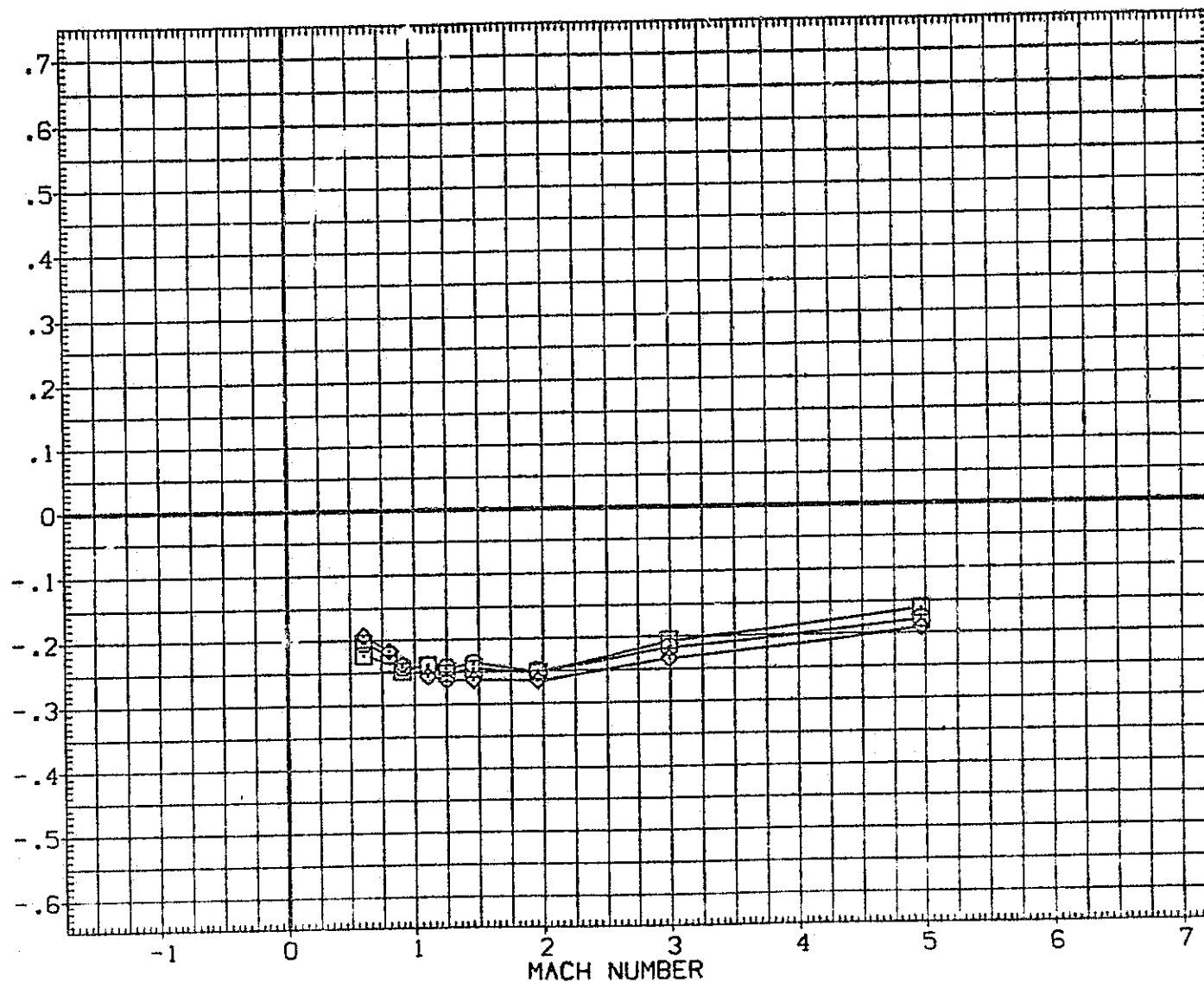


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(1) BETA = 6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIGIN	ALPHA
(VIC008)	MSFC S94(1A33) 740TS (TIPISIP201)	ORB STING	.000
(VIC009)	MSFC S94(1A33) 740TS (TIPISIP201)	ORB STING	5.000
(VIC010)	MSFC S94(1A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

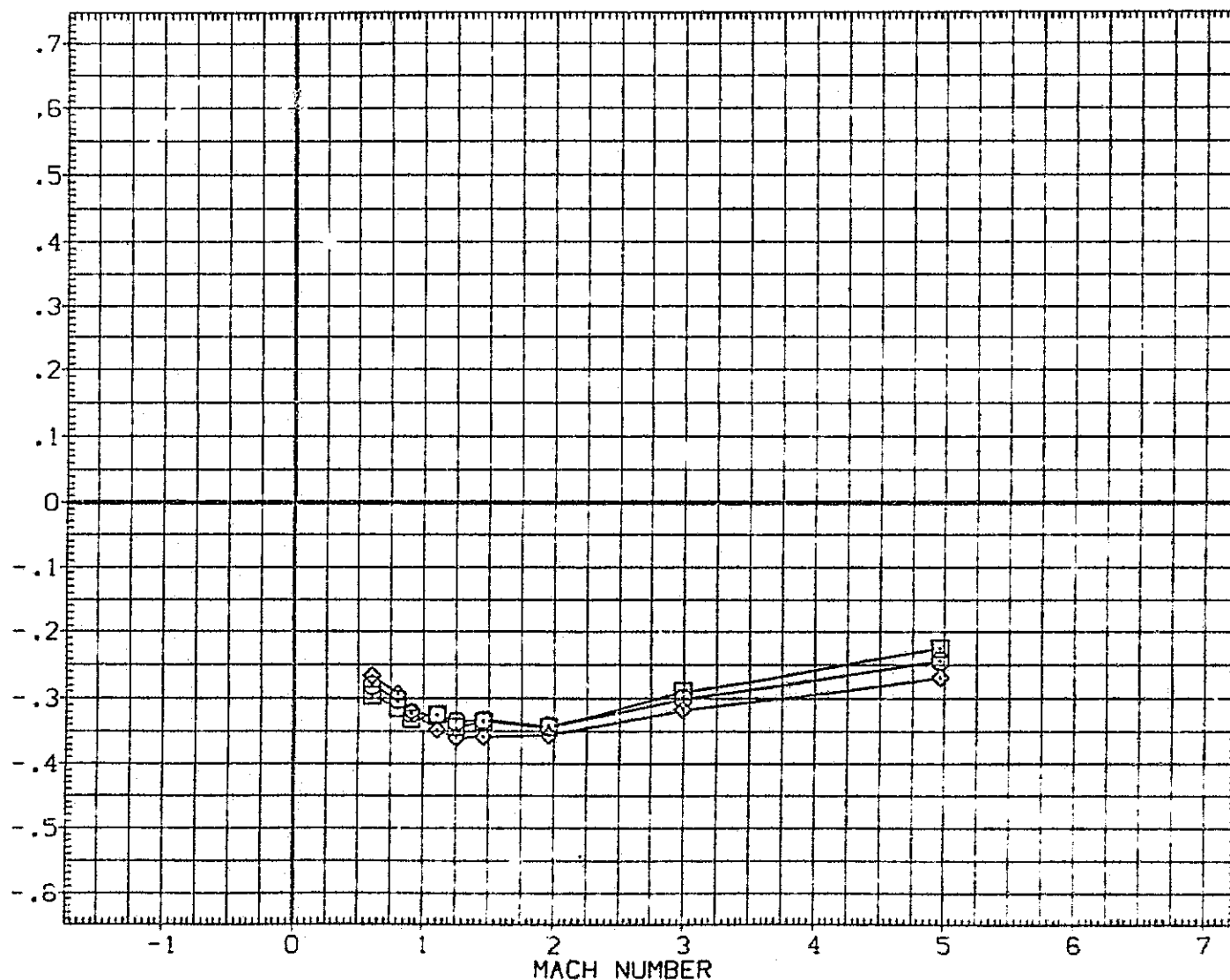


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(J)BETA = 8.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORBITAL STING	ALPHA
(VIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	.000
(VIC009)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	5.000
(VIC010)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

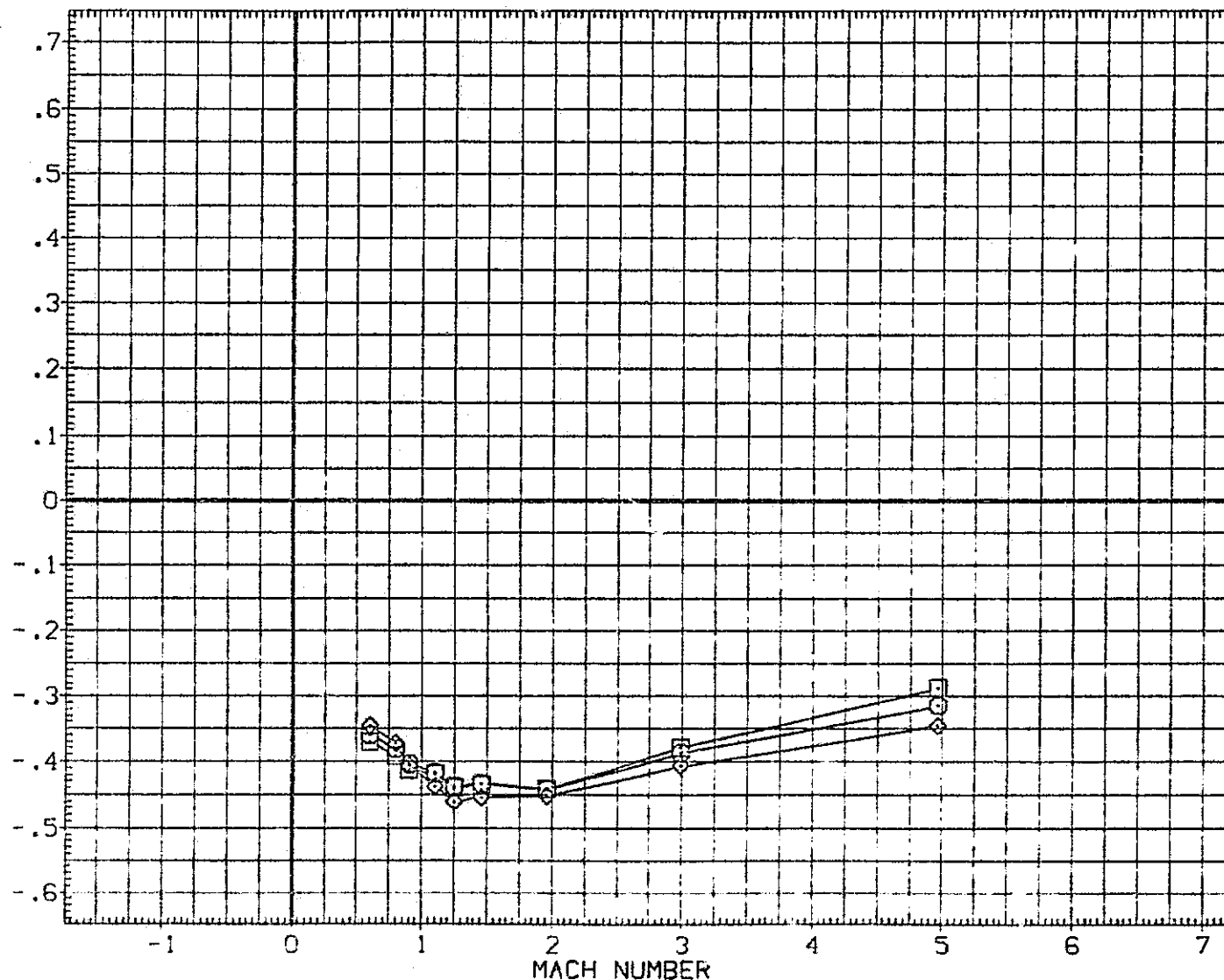


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(DELTA) = 10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008)	MSFC S94(A33) 740TS (TIP(SIP201)
(VIC009)	MSFC S94(A33) 740TS (TIP(SIP201)
(VIC010)	MSFC S94(A33) 740TS (TIP(SIP201)

ORBITAL STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

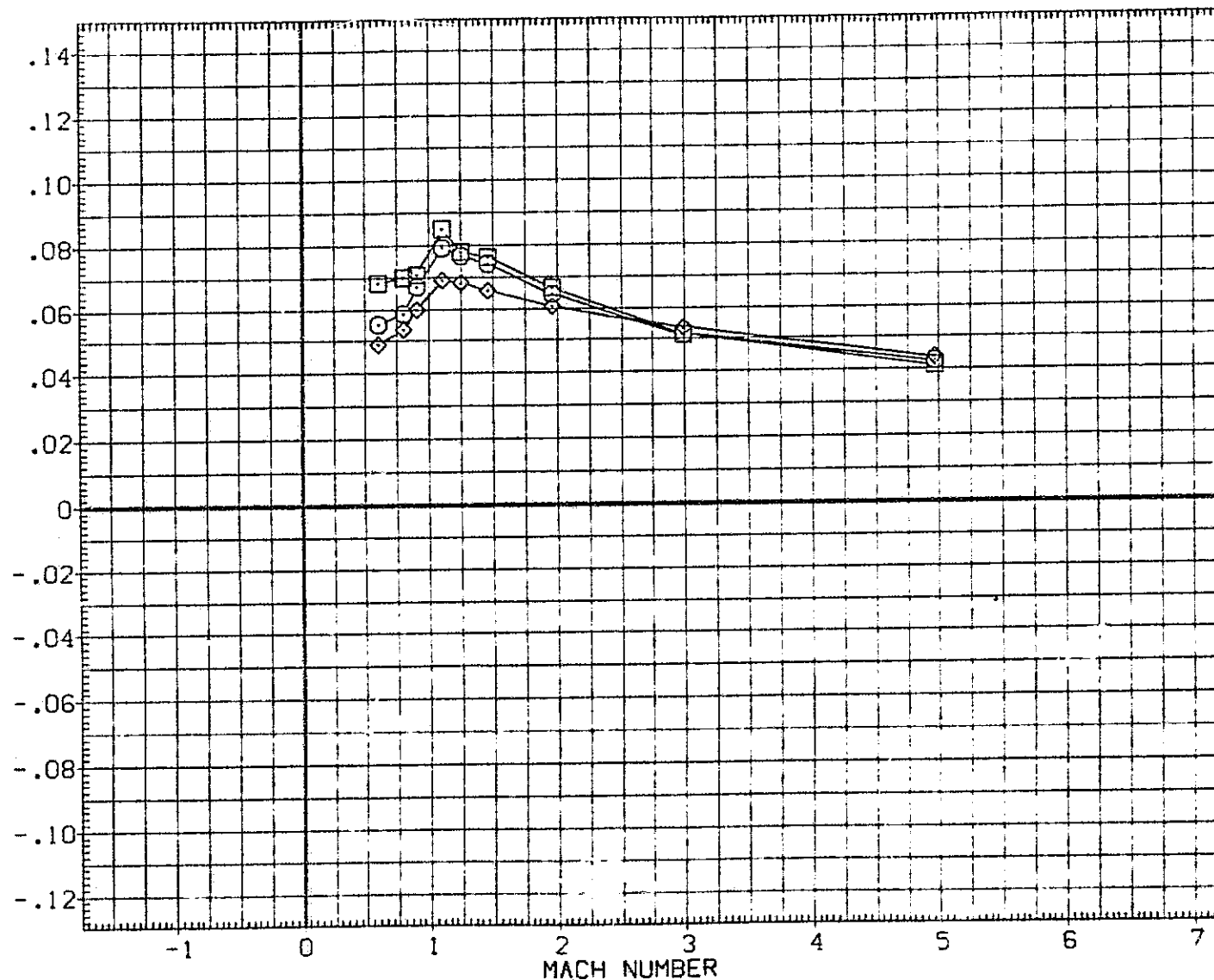


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(A) BETA = -10.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC008) \square MSFC 594(A33) 740TS (TIPISIP201)
 (VIC009) \square MSFC 594(A33) 740TS (TIPISIP201)
 (VIC010) \diamond MSFC 594(A33) 740TS (TIPISIP201)

ORB STING
 ORB STING
 ORB STING

ALPHA
 .000
 5.000
 -5.000

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

ROLLING MOMENT COEFFICIENT, CBL

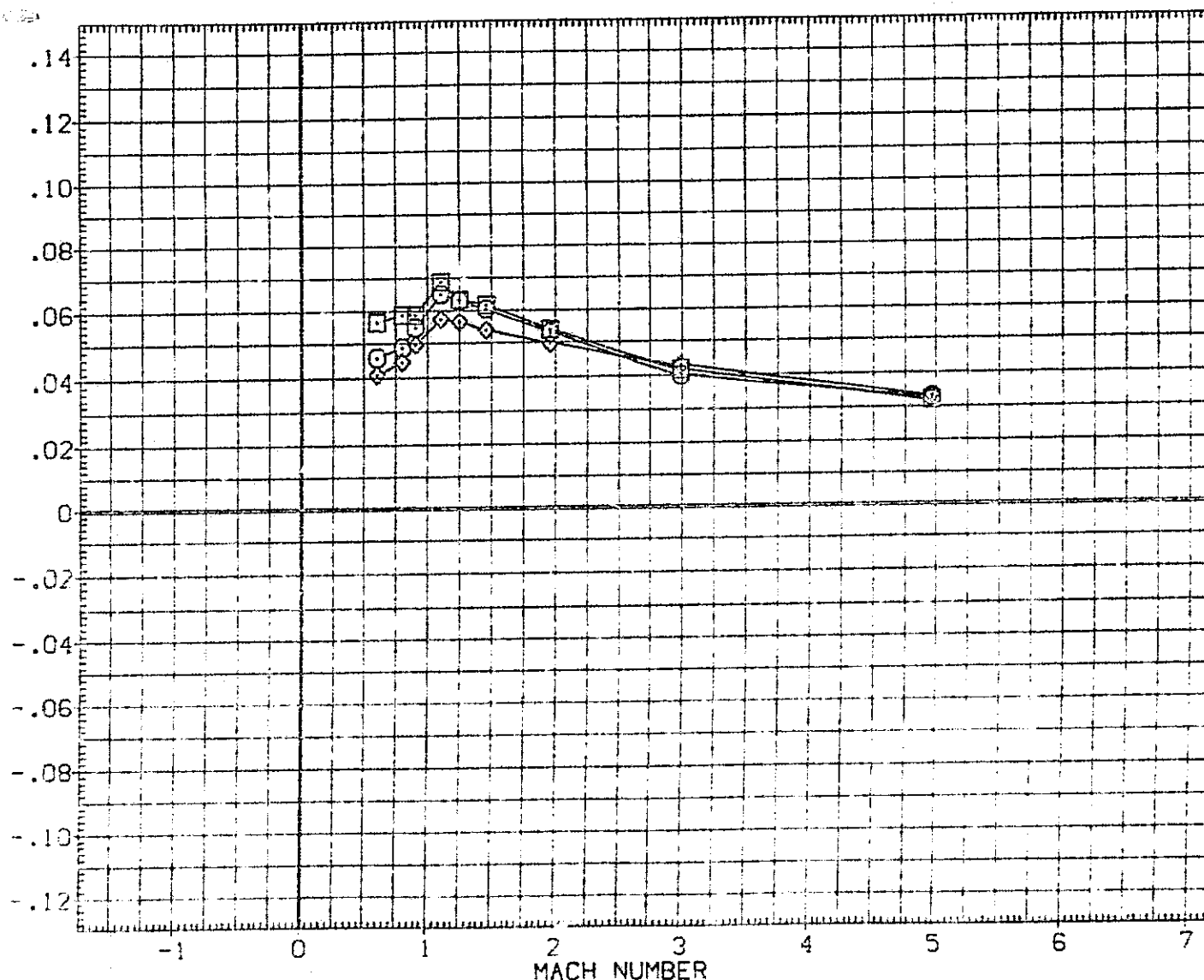


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(B) SETA = -8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008)	MSFC 594(A33) 740TS (TIPISIP201)
(VIC009)	MSFC 594(A33) 740TS (TIPISIP201)
(VIC010)	MSFC 594(A33) 740TS (TIPISIP201)

ORBITAL STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
SREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

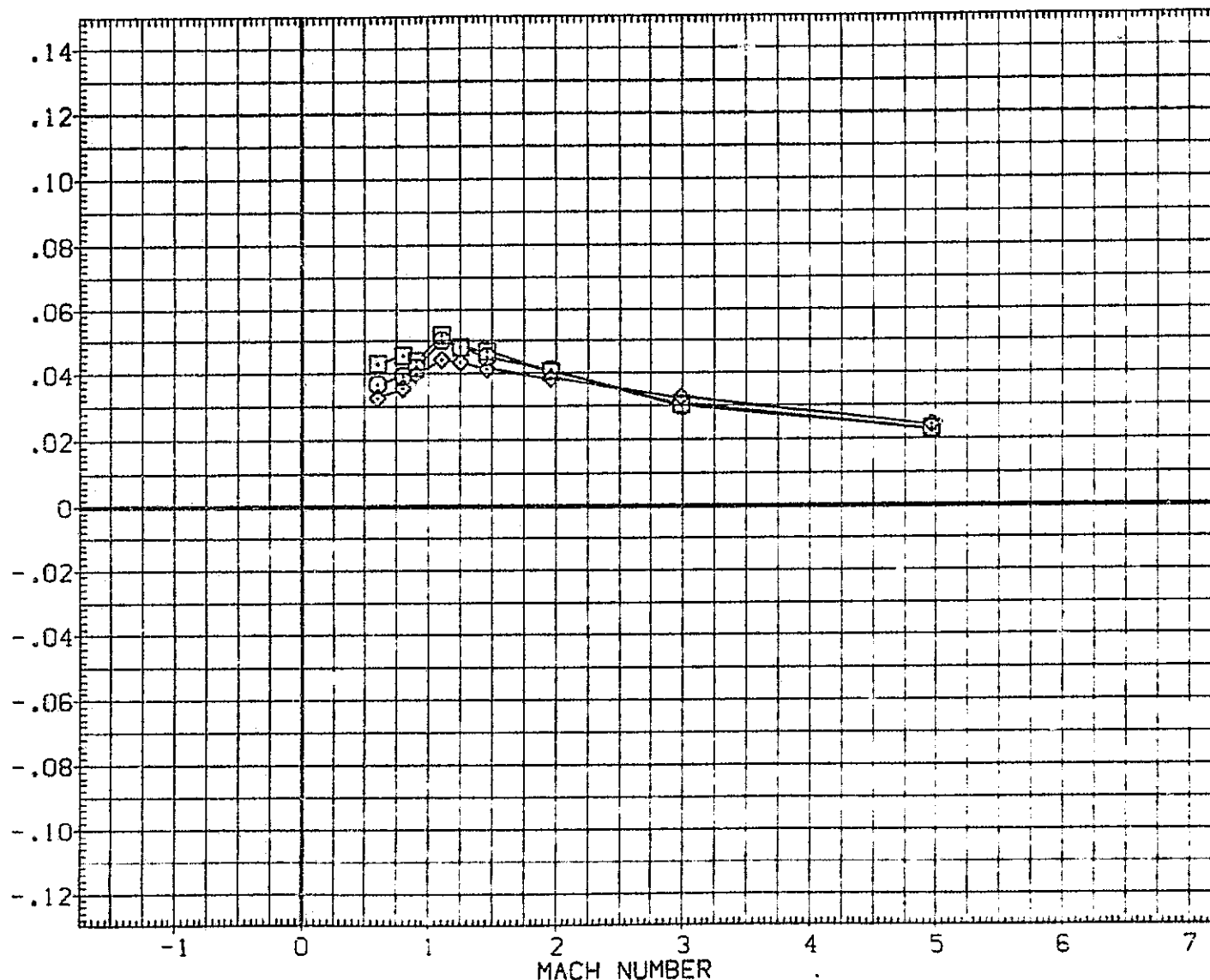


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(C)BETA = -6.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC008) \square MSFC 594(A33) 740TS (TIPISIP201)
(VIC009) \square MSFC 594(A33) 740TS (TIPISIP201)
(VIC010) \diamond MSFC 594(A33) 740TS (TIPISIP201)

ORB STING ALPHA
ORB STING .000
ORB STING 5.000
ORB STING -5.000

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
LREF 1290.0000 IN.
BREF 1290.0000 IN.
XMRP 976.0000 IN. XT
YMRP .0000 IN. YT
ZMRP 400.0000 IN. ZT
SCALE .0340

ROLLING MOMENT COEFFICIENT, CBL

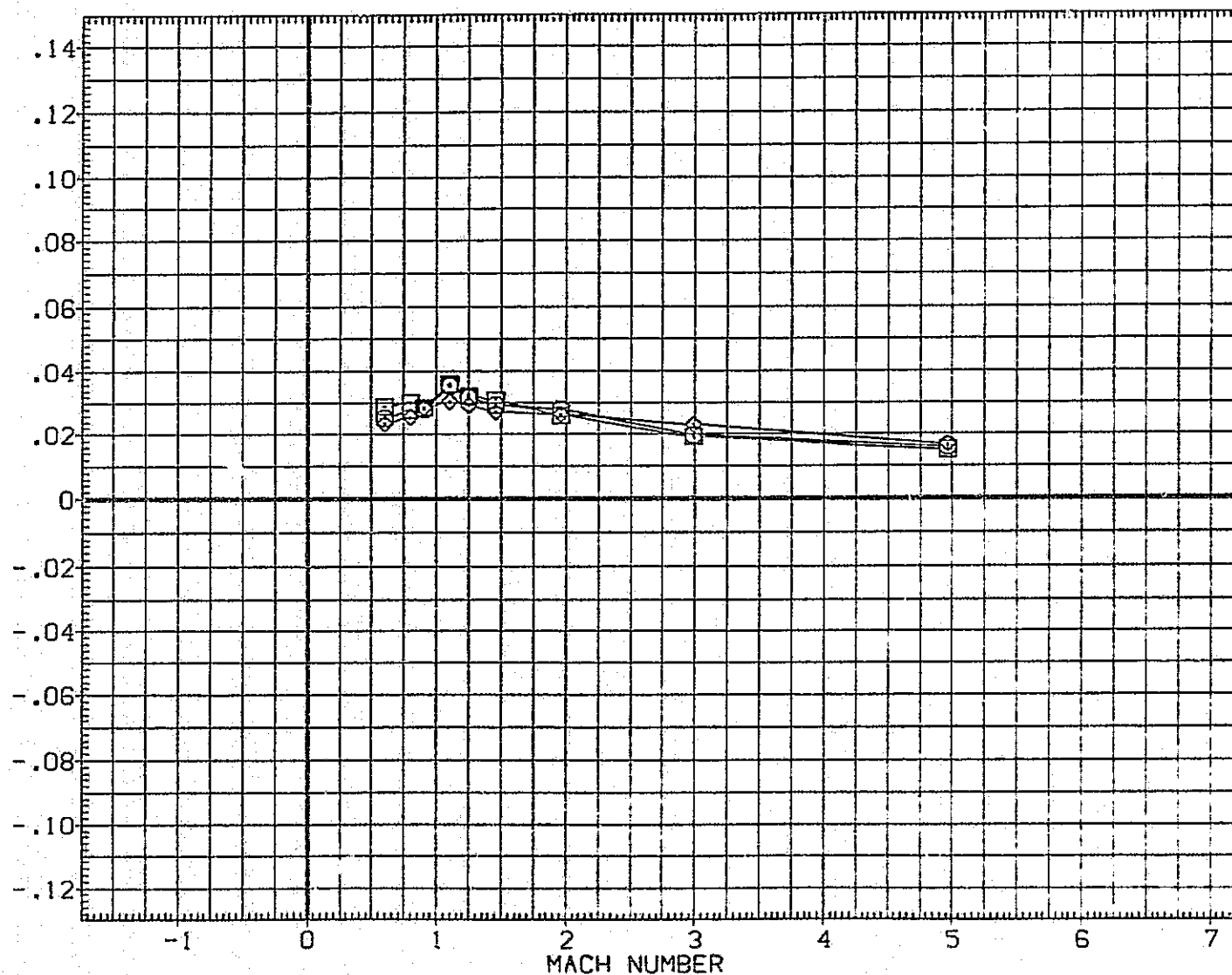


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(D)BETA = -4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIGIN	ALPHA
[VIC008]	MSFC 594(A33) 740TS (TIPISIP201)	ORIGIN STING	.000
[VIC009]	MSFC 594(A33) 740TS (TIPISIP201)	ORIGIN STING	5.000
[VIC010]	MSFC 594(A33) 740TS (TIPISIP201)	ORIGIN STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

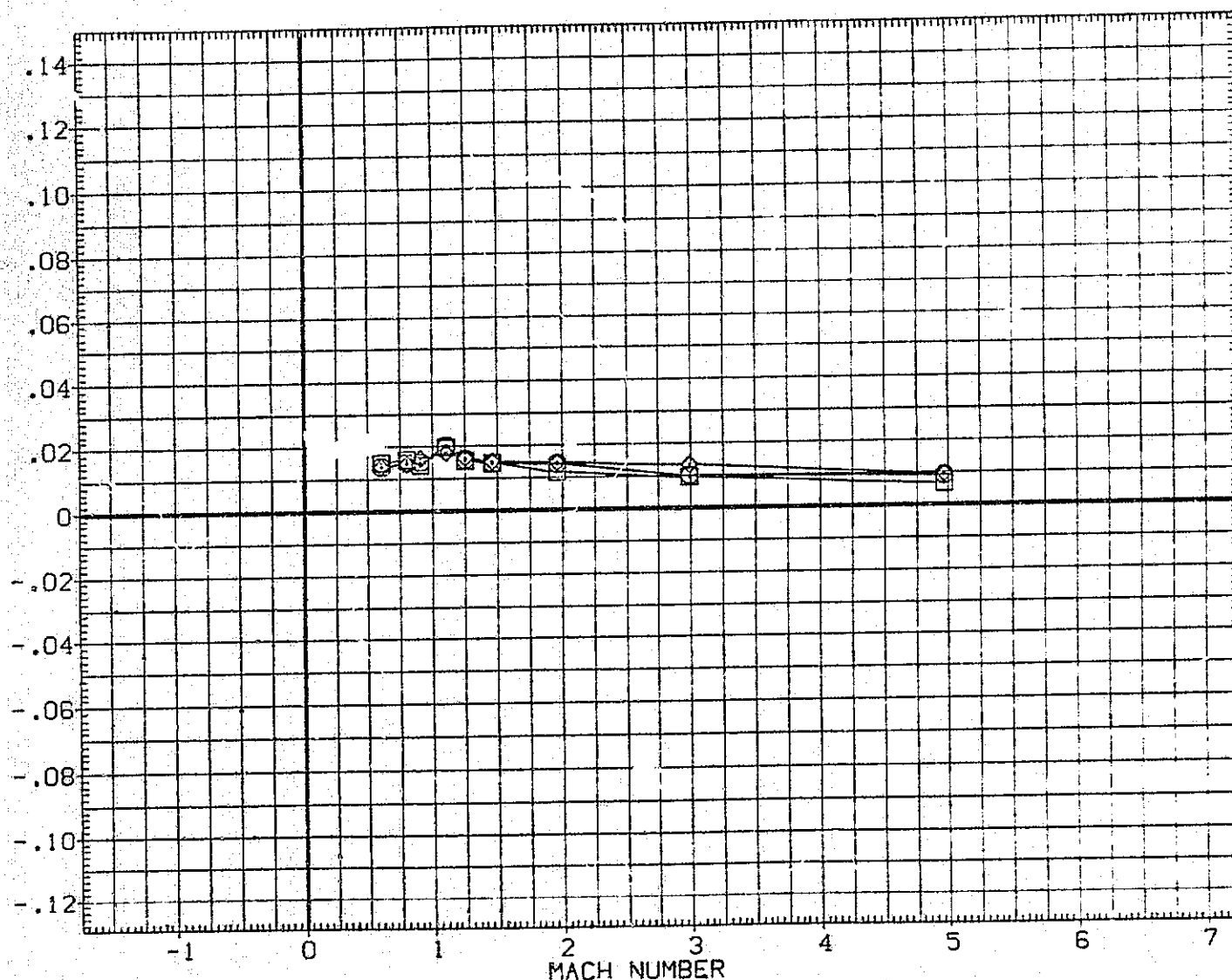


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(E) BETA = -2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008) ○	MSFC 594(1A33) 740TS (TIPISIP201)
(VIC009) □	MSFC 594(1A33) 740TS (TIPISIP201)
(VIC010) ◇	MSFC 594(1A33) 740TS (TIPISIP201)

ORB STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	978.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

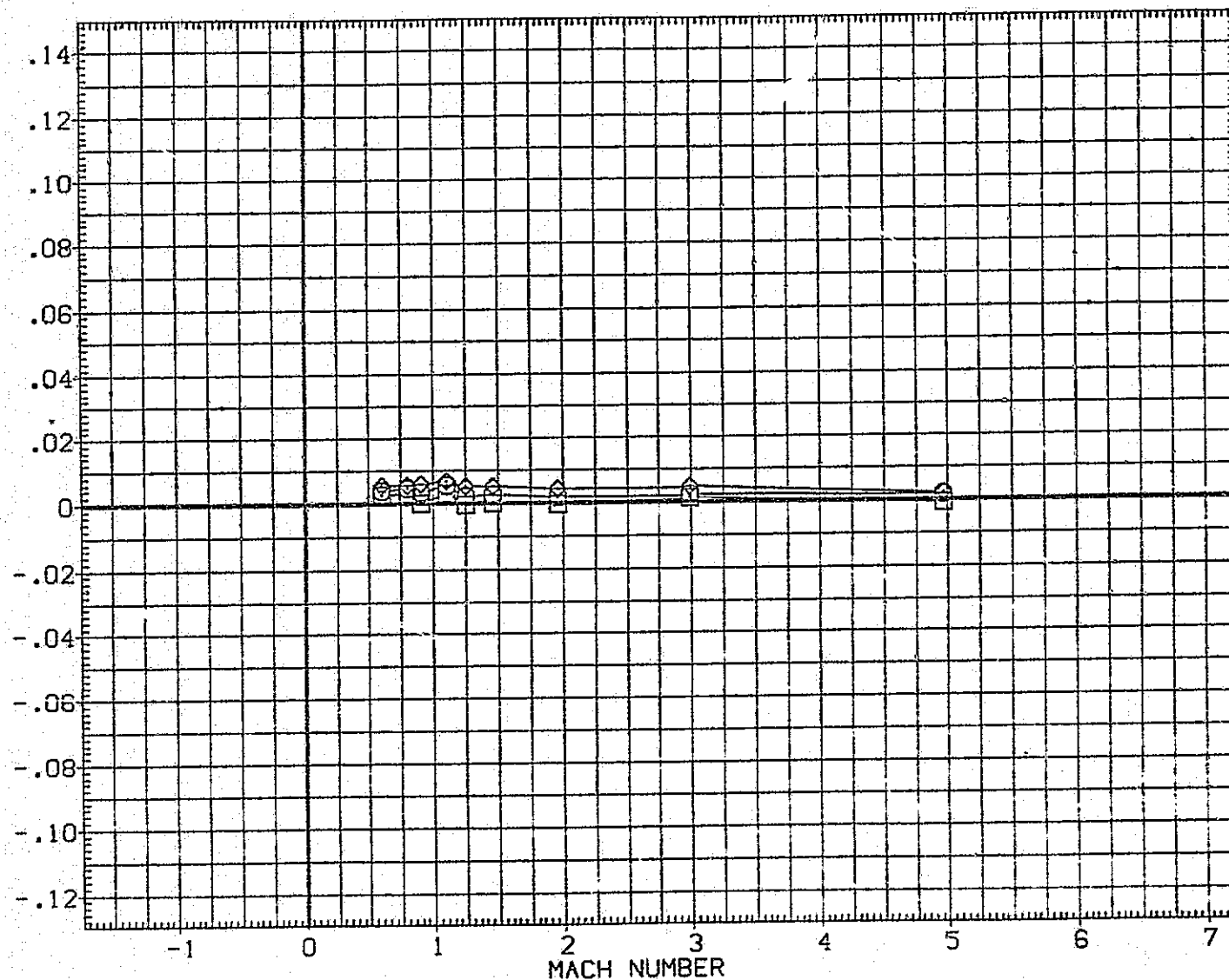


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(F)BETA = .00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA
(VIC008) ○	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING .000
(VIC009) □	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING 5.000
(VIC010) ◇	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING -5.000

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

ROLLING MOMENT COEFFICIENT, CBL

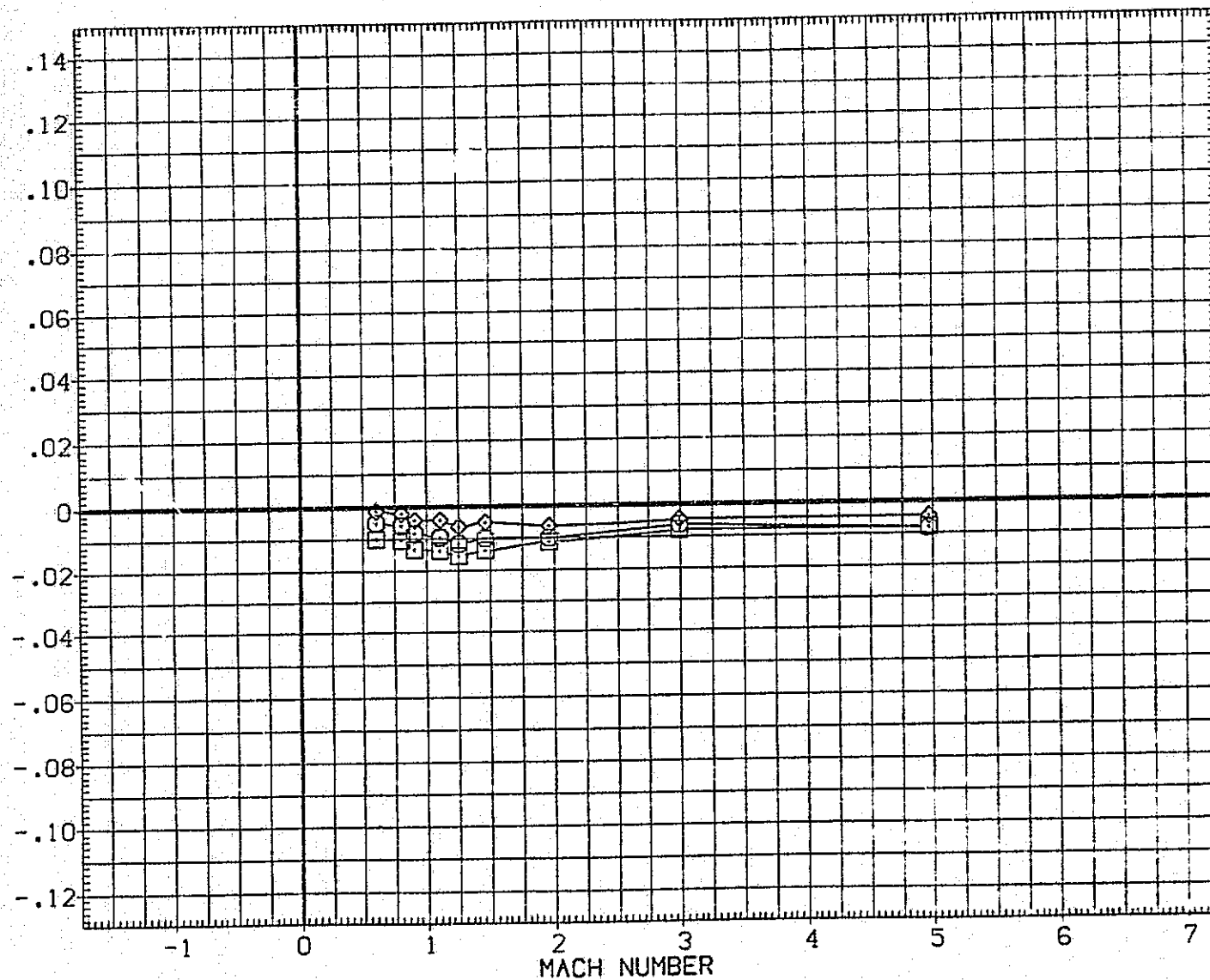


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(G)BETA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIGIN	ALPHA
(VIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	.000
(VIC009)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	5.000
(VIC010)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

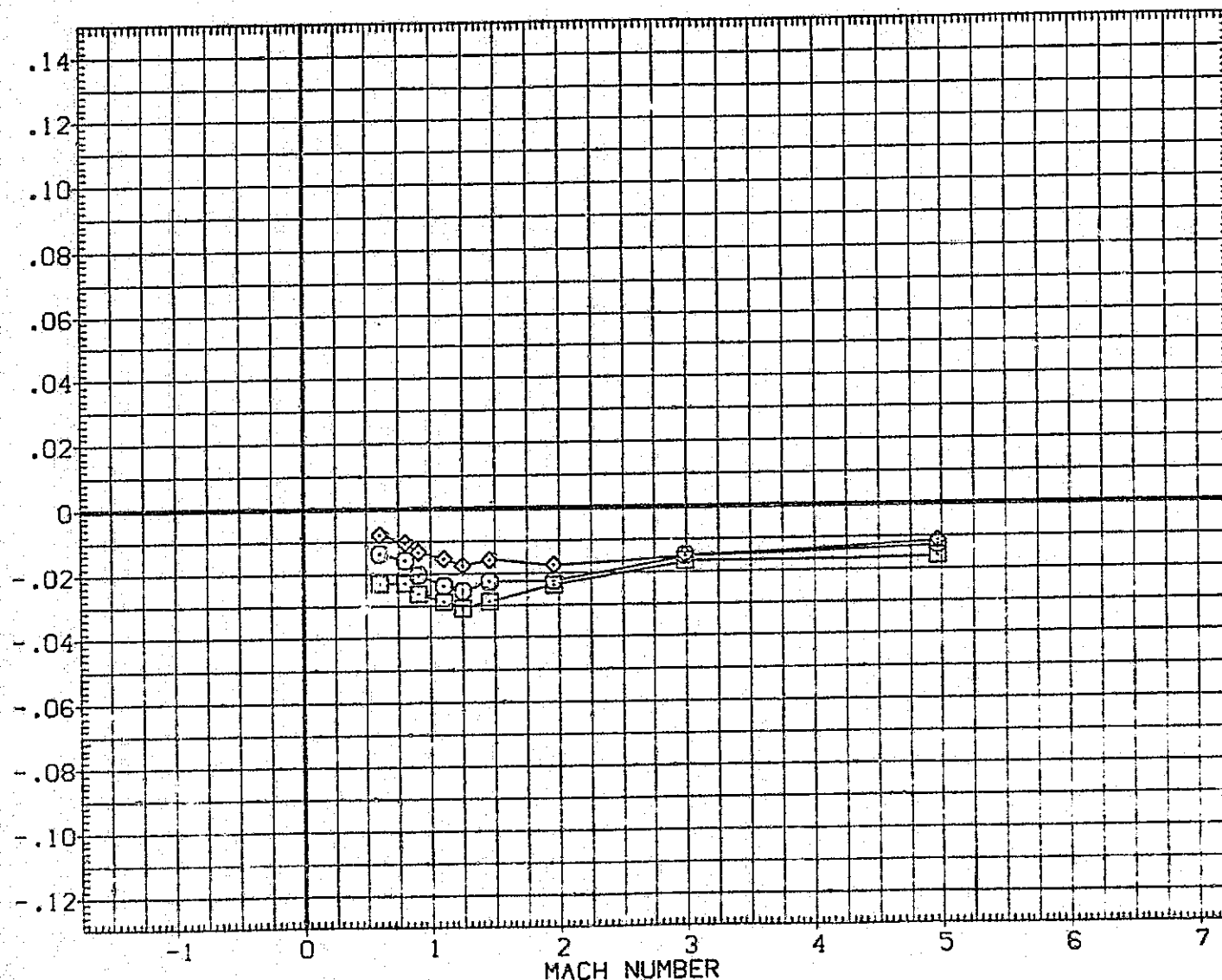


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(H)BETA = 4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIG STING	ALPHA
(VIC008)	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING	.000
(VIC009)	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING	5.000
(VIC010)	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	975.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

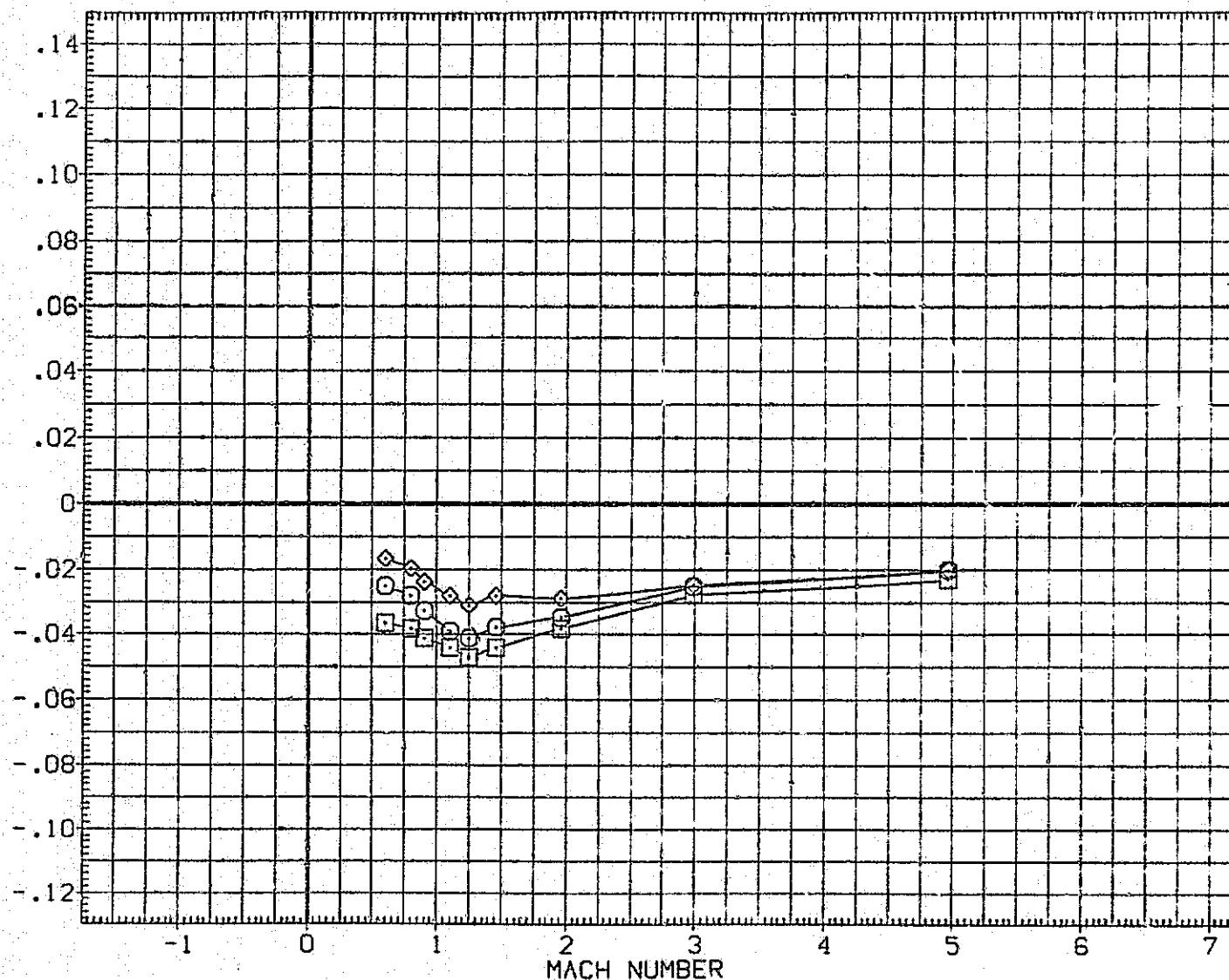


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(1) BETA = 6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
(VIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	.000
(VIC009)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	5.000
(VIC010)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

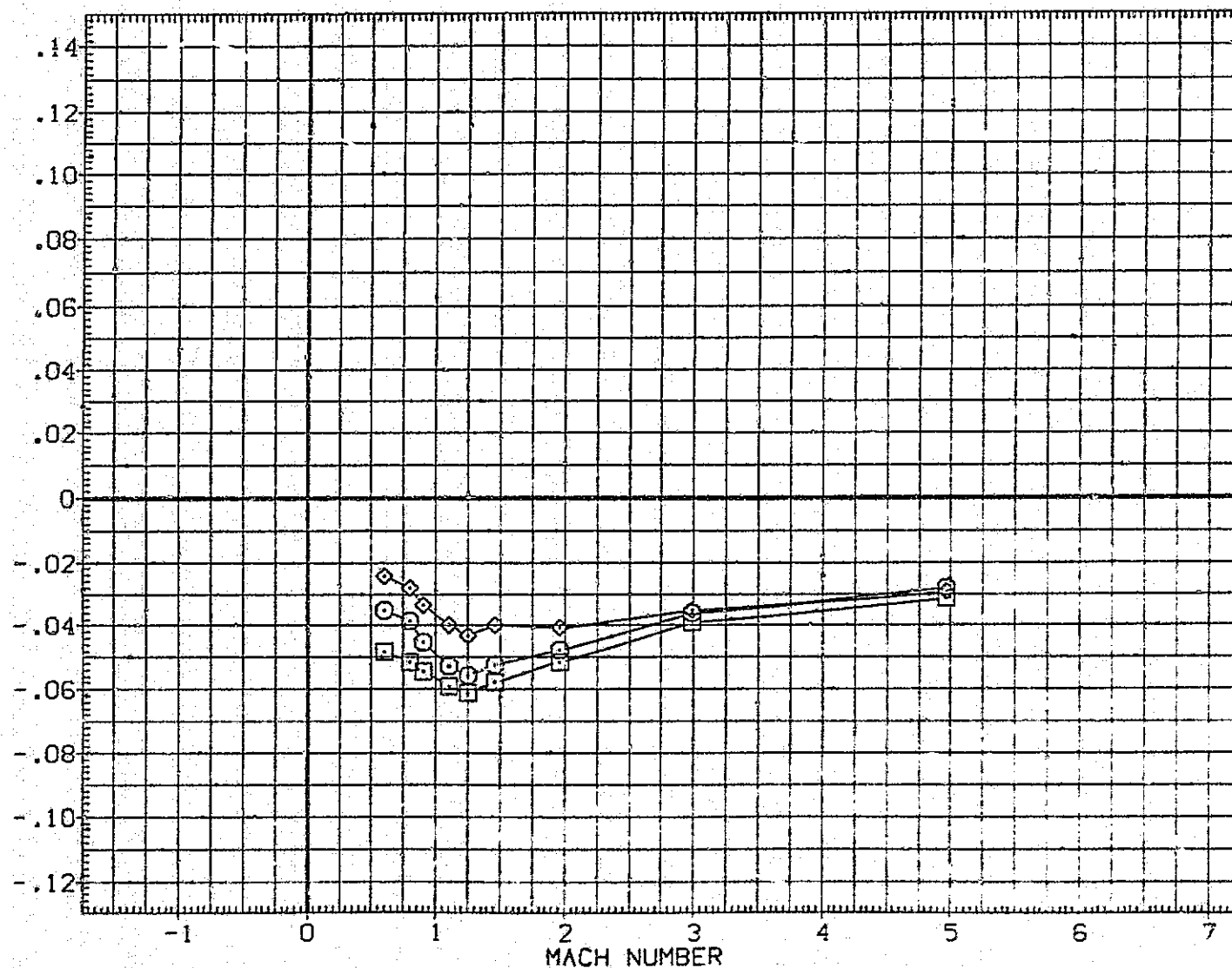


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(J)BETA = 8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
[VIC008]	MSFC 594(1A33) 740TS (TIPISIP201)
[VIC009]	MSFC 594(1A33) 740TS (TIPISIP201)
[VIC010]	MSFC 594(1A33) 740TS (TIPISIP201)

ORB STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

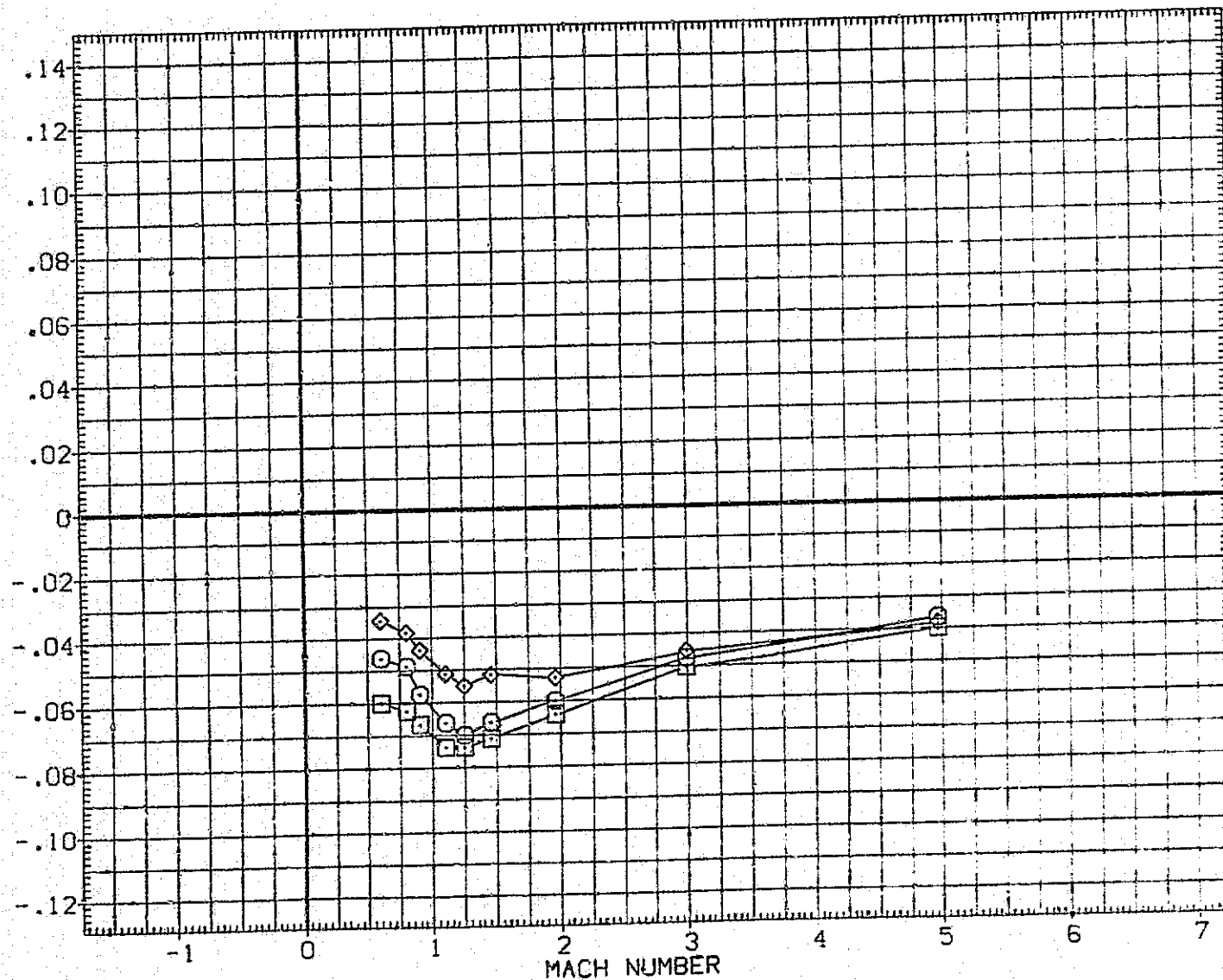


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(K)BETA = 10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA
(VIC008) ○	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING .000
(VIC009) □	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING 5.000
(VIC010) ◇	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING -5.000

REFERENCE INFORMATION		
SREF	2690.0000	SD. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SC/E	.0040	

YAWING MOMENT COEFFICIENT, CYN

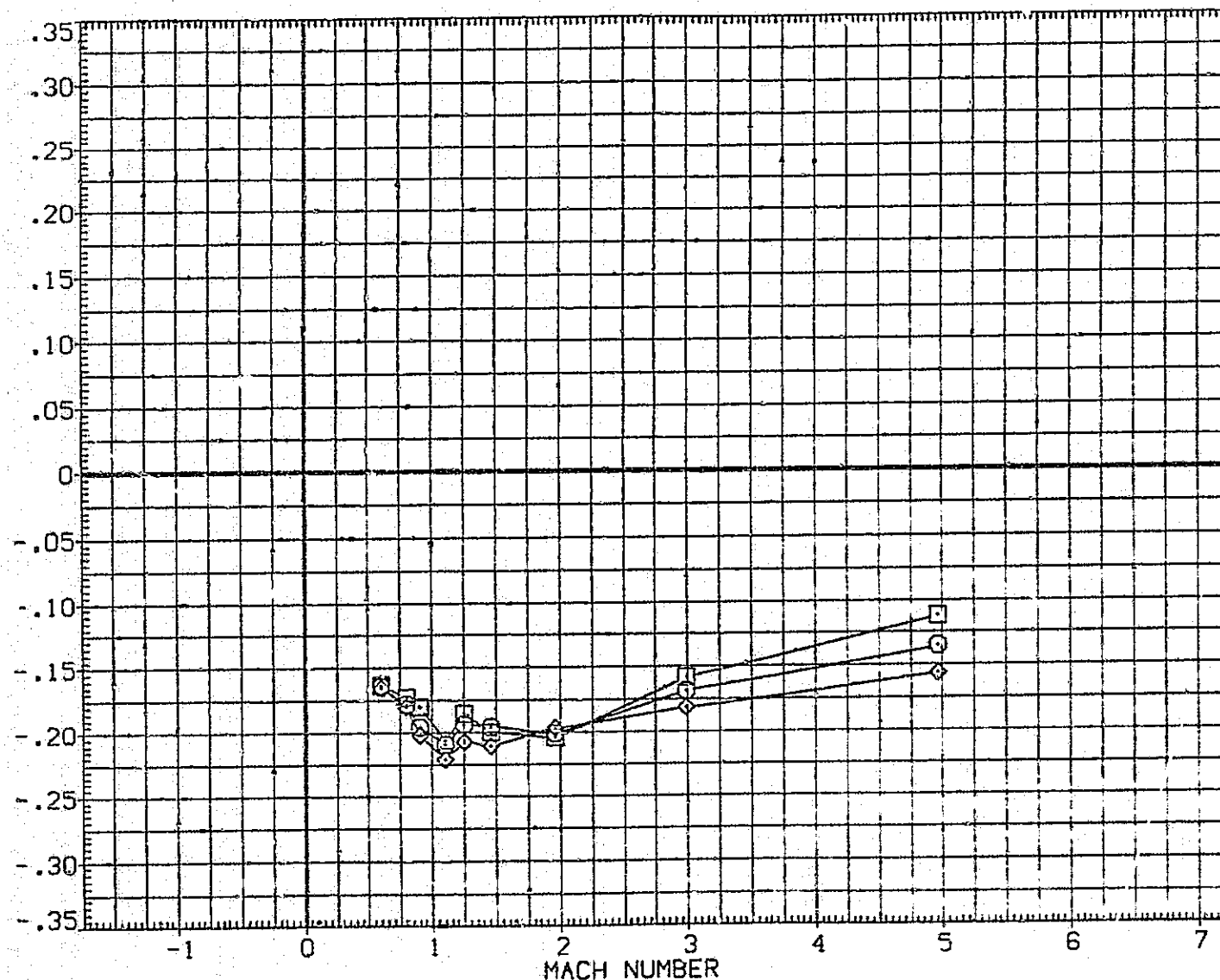


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(A) BETA = -10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
[VIC008] □	MSFC S94(1A33) 740TS (TIPISIP201)
[VIC009] □	MSFC S94(1A33) 740TS (TIPISIP201)
[VIC010] ◇	MSFC S94(1A33) 740TS (TIPISIP201)

ORB STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

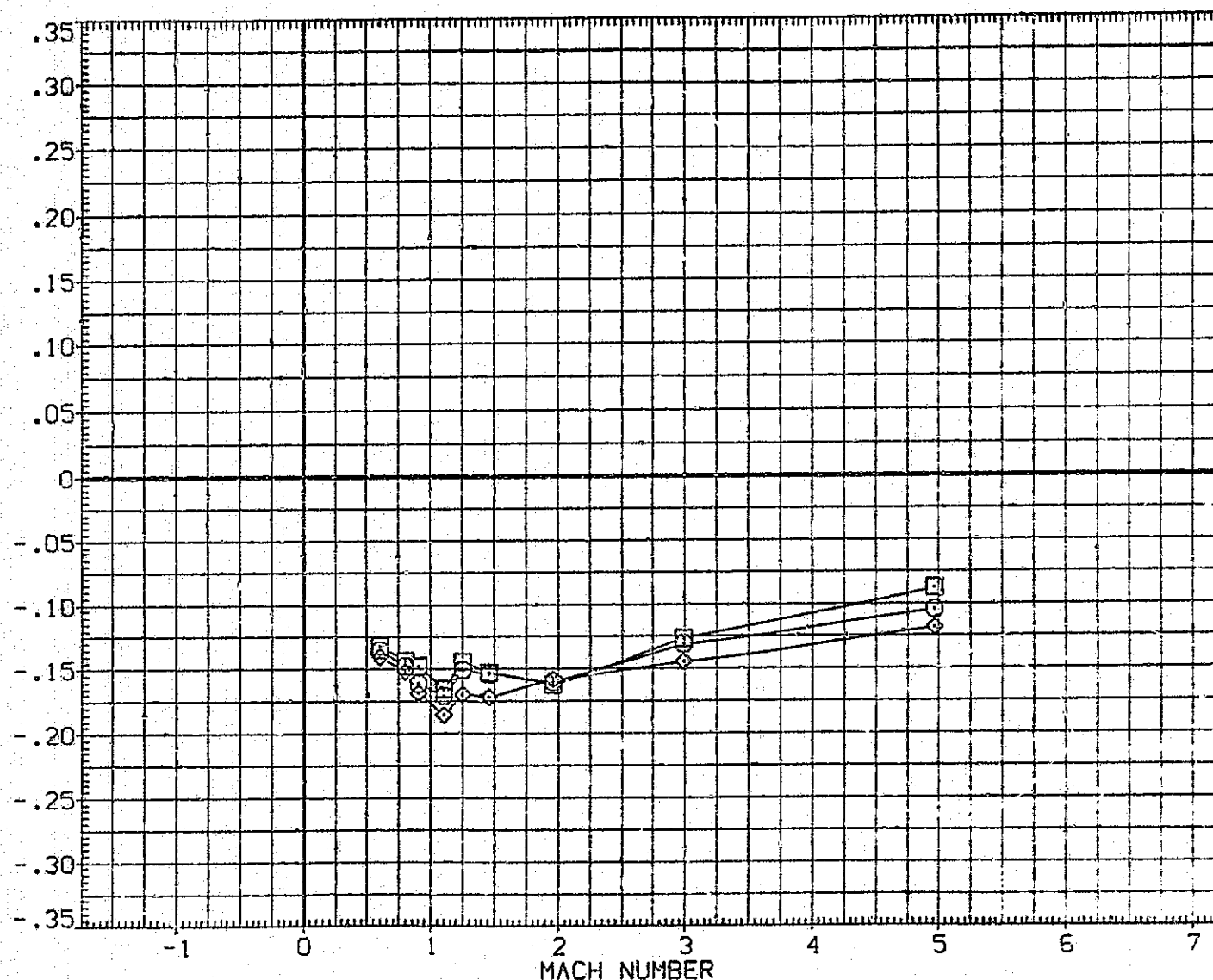


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(B) BETA = -8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
(VIC008)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING	.000
(VIC009)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING	5.000
(VIC010)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, C_{YN}

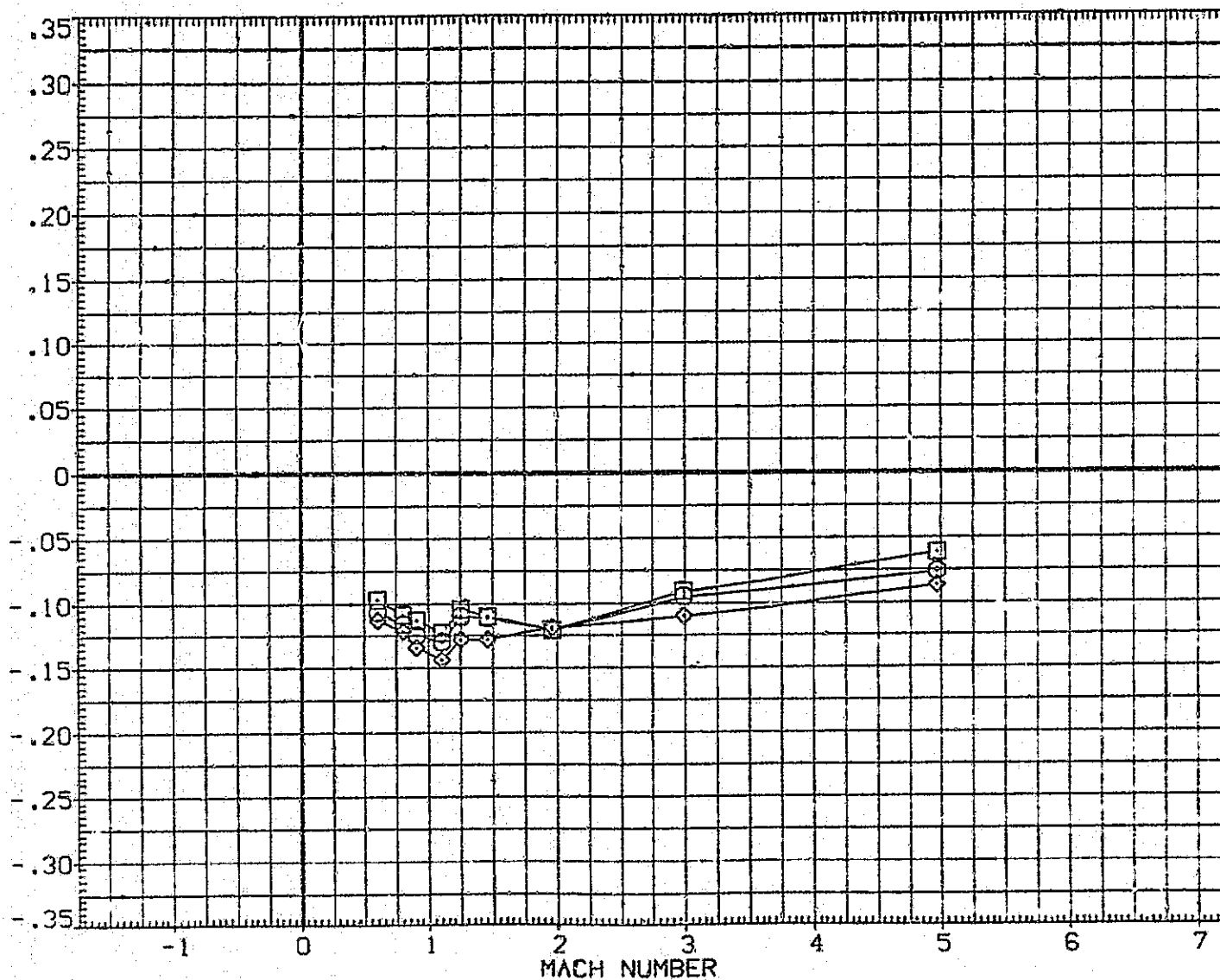


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(C)BETA = -6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIG STING	ALPHA
(VIC008)	MSFC 594(1A33) 740TS (TIP/SIP201)	ORB STING	.000
(VIC009)	MSFC 594(1A33) 740TS (TIP/SIP201)	ORB STING	5.000
(VIC010)	MSFC 594(1A33) 740TS (TIP/SIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

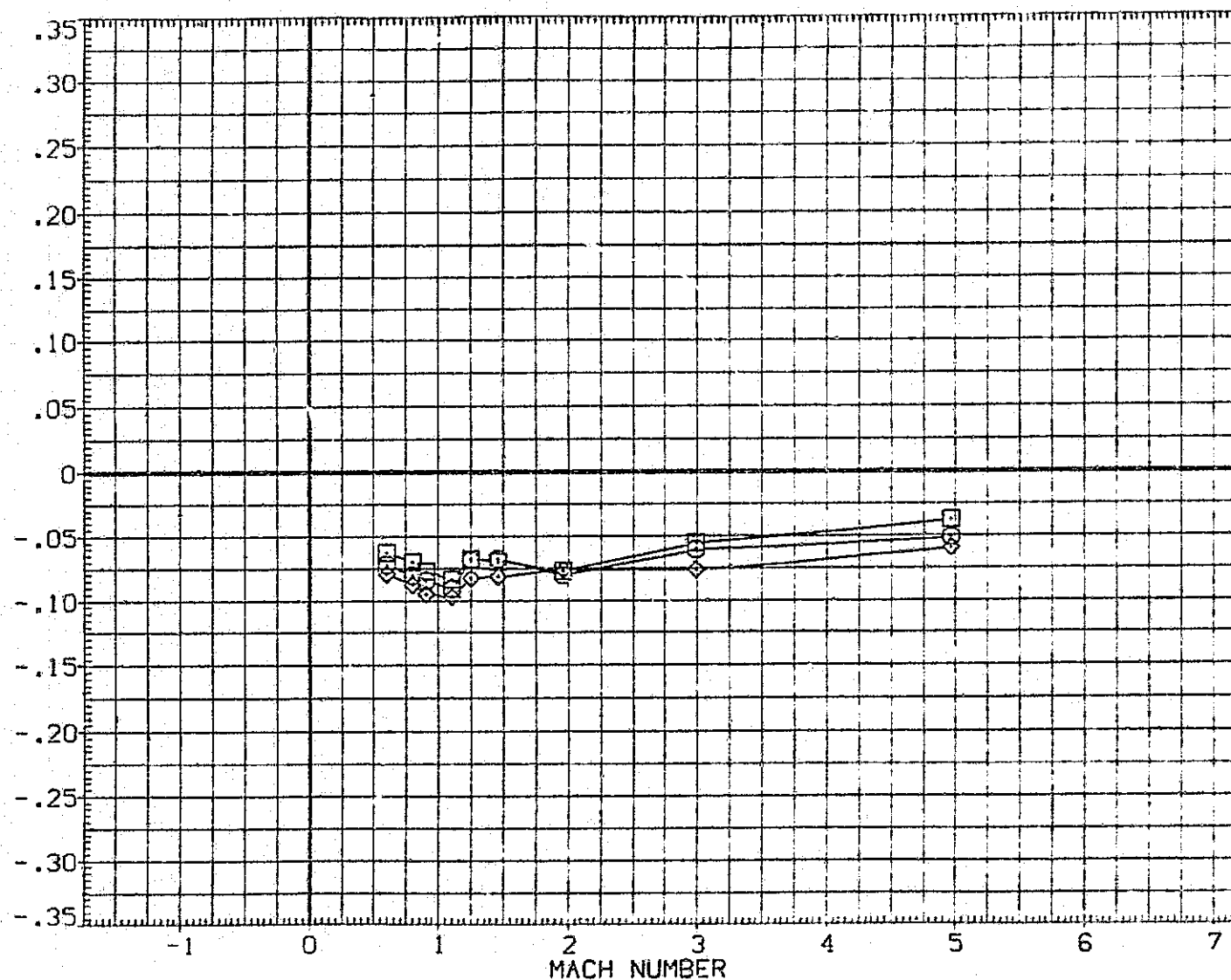





FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(D)BETA = -4.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC008)  MSFC 594(1A33) 740TS (TIPISIP201)
 (VIC009)  MSFC 594(1A33) 740TS (TIPISIP201)
 (VIC010)  MSFC 594(1A33) 740TS (TIPISIP201)

ORB STING
 ORB STING
 ORB STING

ALPHA
 .000
 5.000
 -5.000

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

YAWING MOMENT COEFFICIENT, CYN

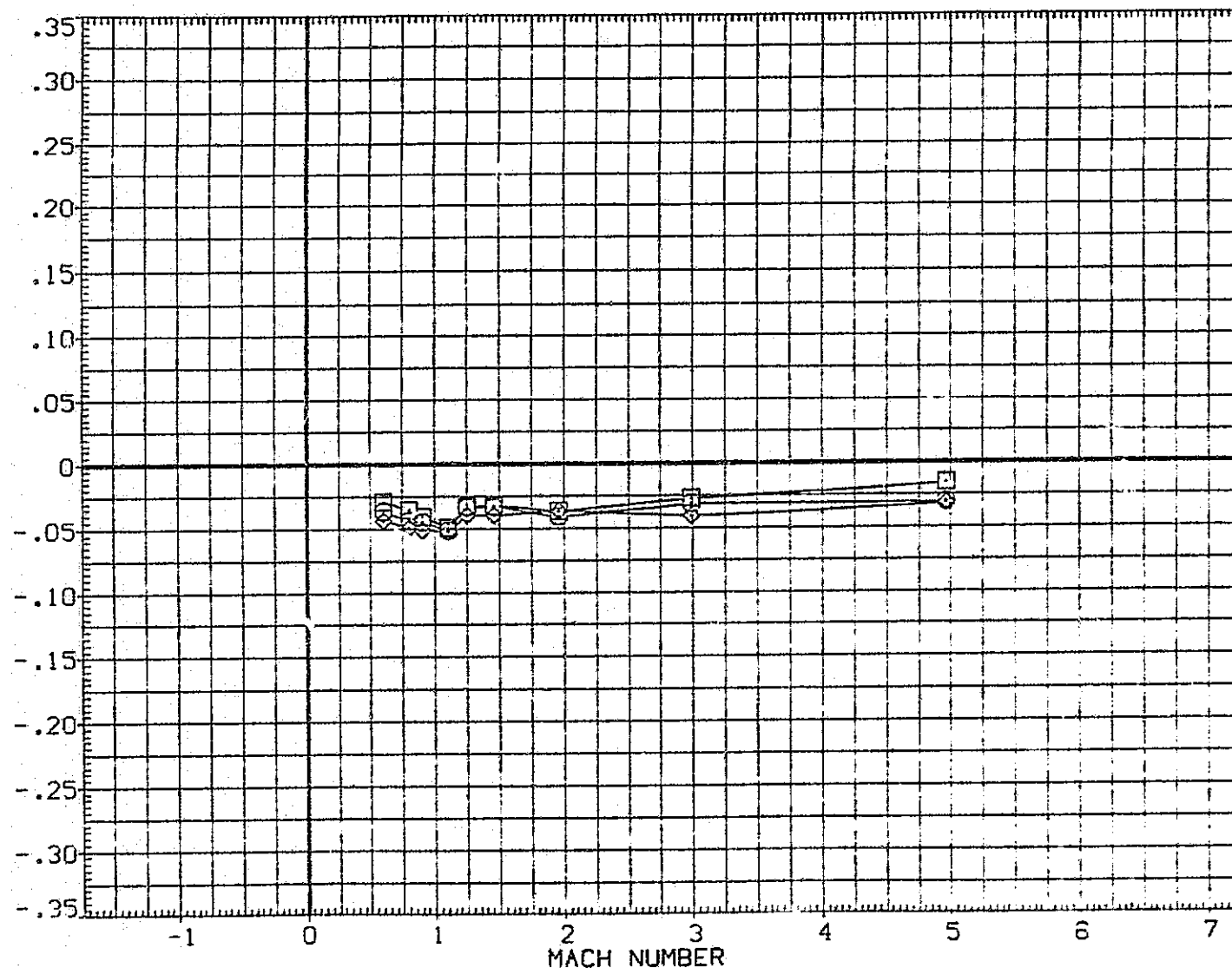


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(E)BETA = -2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008) □	MSFC 594(1A33) 740TS (TIP1SIP201)
(VIC009) □	MSFC 594(1A33) 740TS (TIP1SIP201)
(VIC010) ◇	MSFC 594(1A33) 740TS (TIP1SIP201)

ORB STING	ALPHA
ORB STING	.000
ORB STING	5.000
ORB STING	-5.000

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

YAWING MOMENT COEFFICIENT, CYN

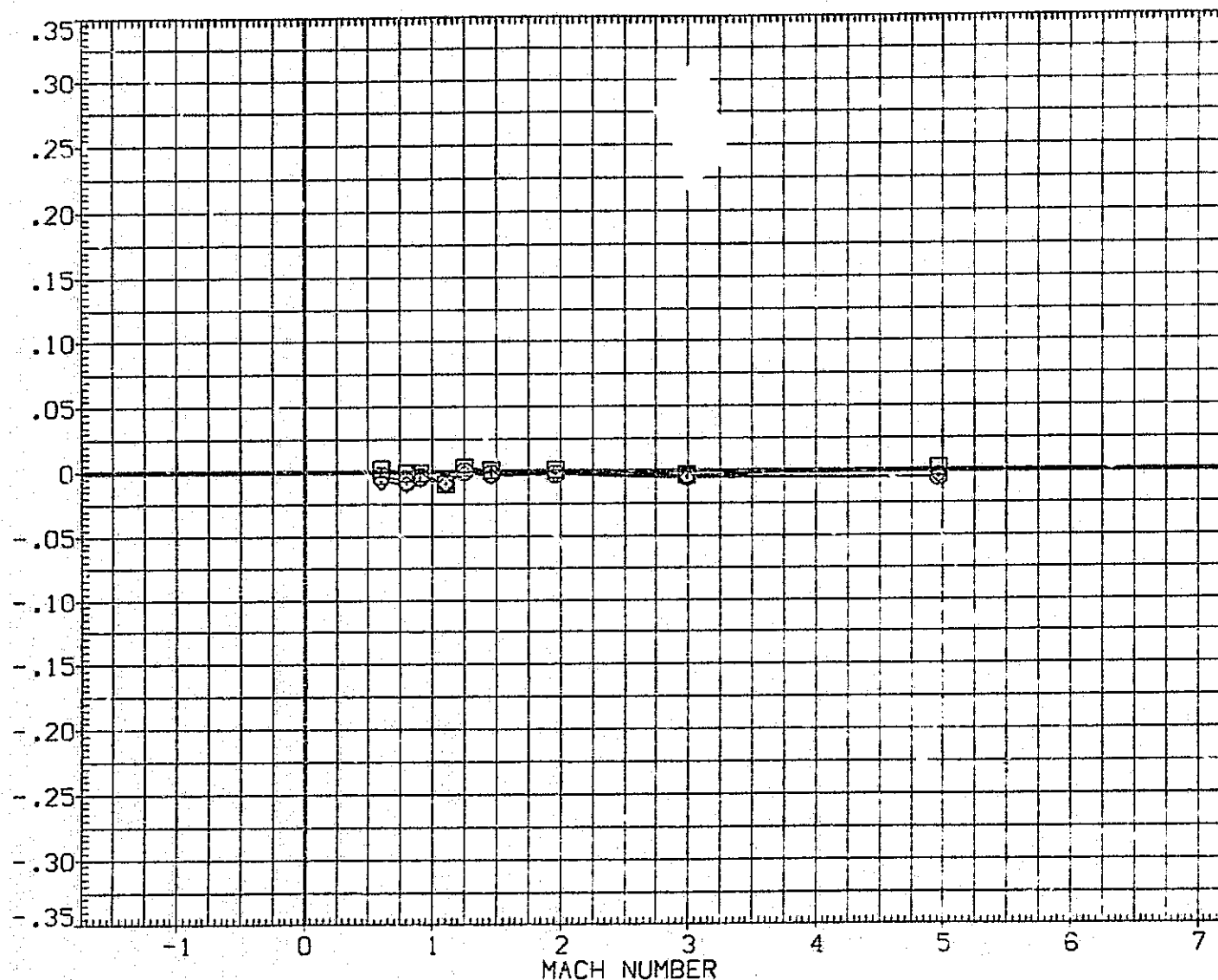


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(F)BETA = .00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
(VIC008)	MSFC 594(IA33) 740TS (TIPISIP201)	ORB STING	.000
(VIC009)	MSFC 594(IA33) 740TS (TIPISIP201)	ORB STING	5.000
(VIC010)	MSFC 594(IA33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

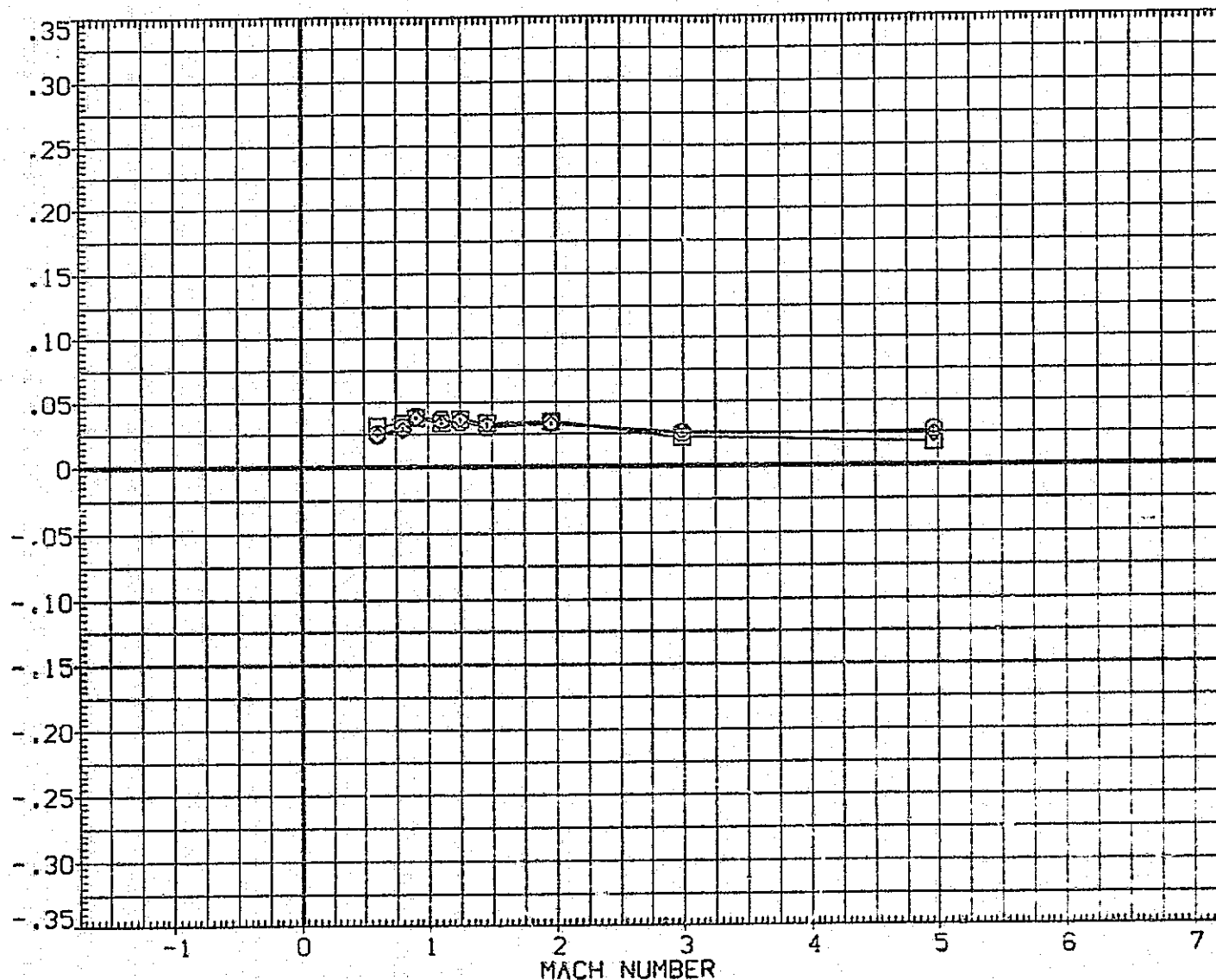


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(G)BETA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIGIN	ALPHA
(VIC008)	MSFC 594 (A33) 740TS (TIPISIP201)	ORB STING	.000
(VIC009)	MSFC 594 (A33) 740TS (TIPISIP201)	ORB STING	5.000
(VIC010)	MSFC 594 (A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2650.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

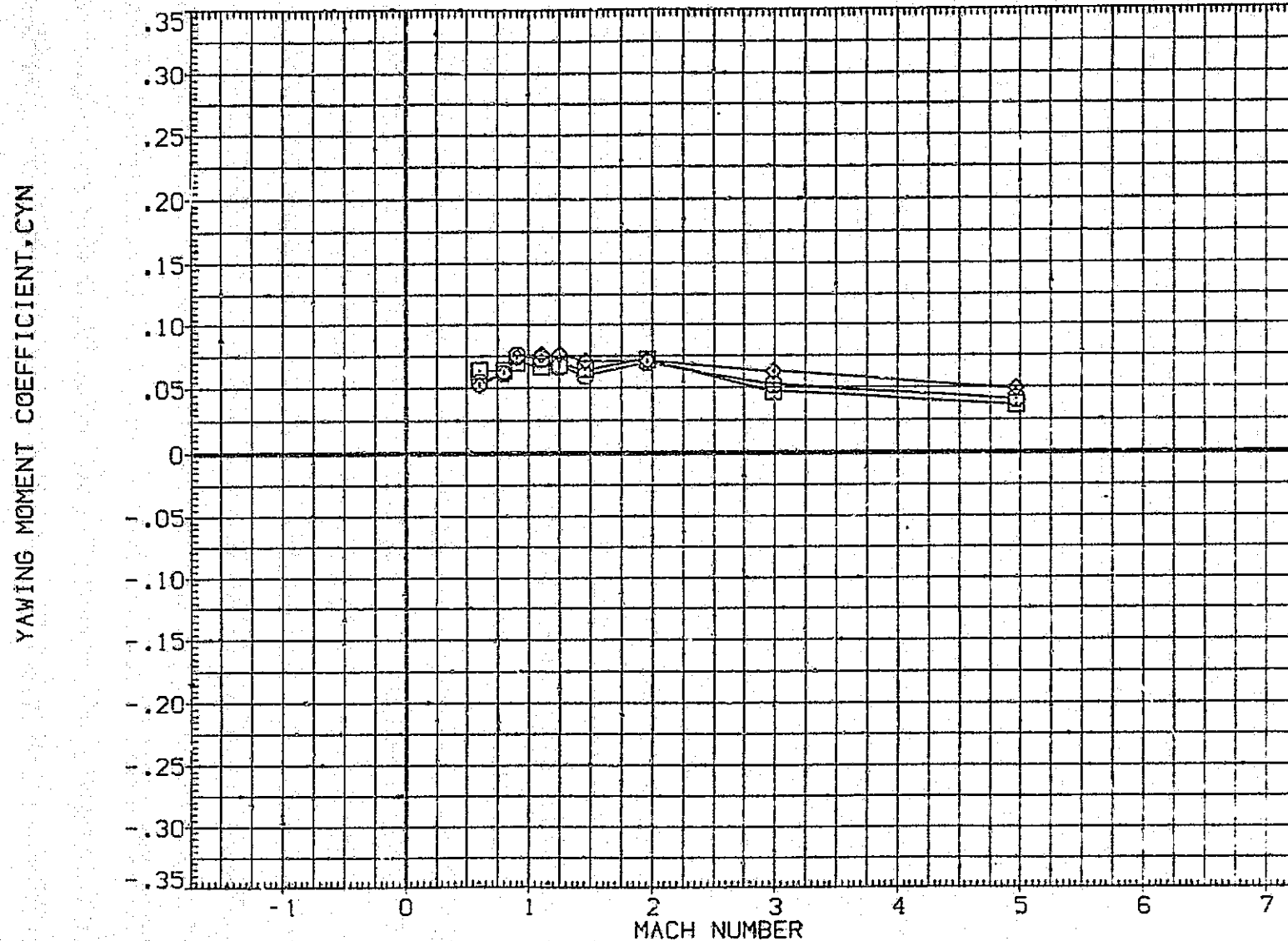


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS

(H)BETA = 4.00

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
(VIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	.000
(VIC009)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	5.000
(VIC010)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

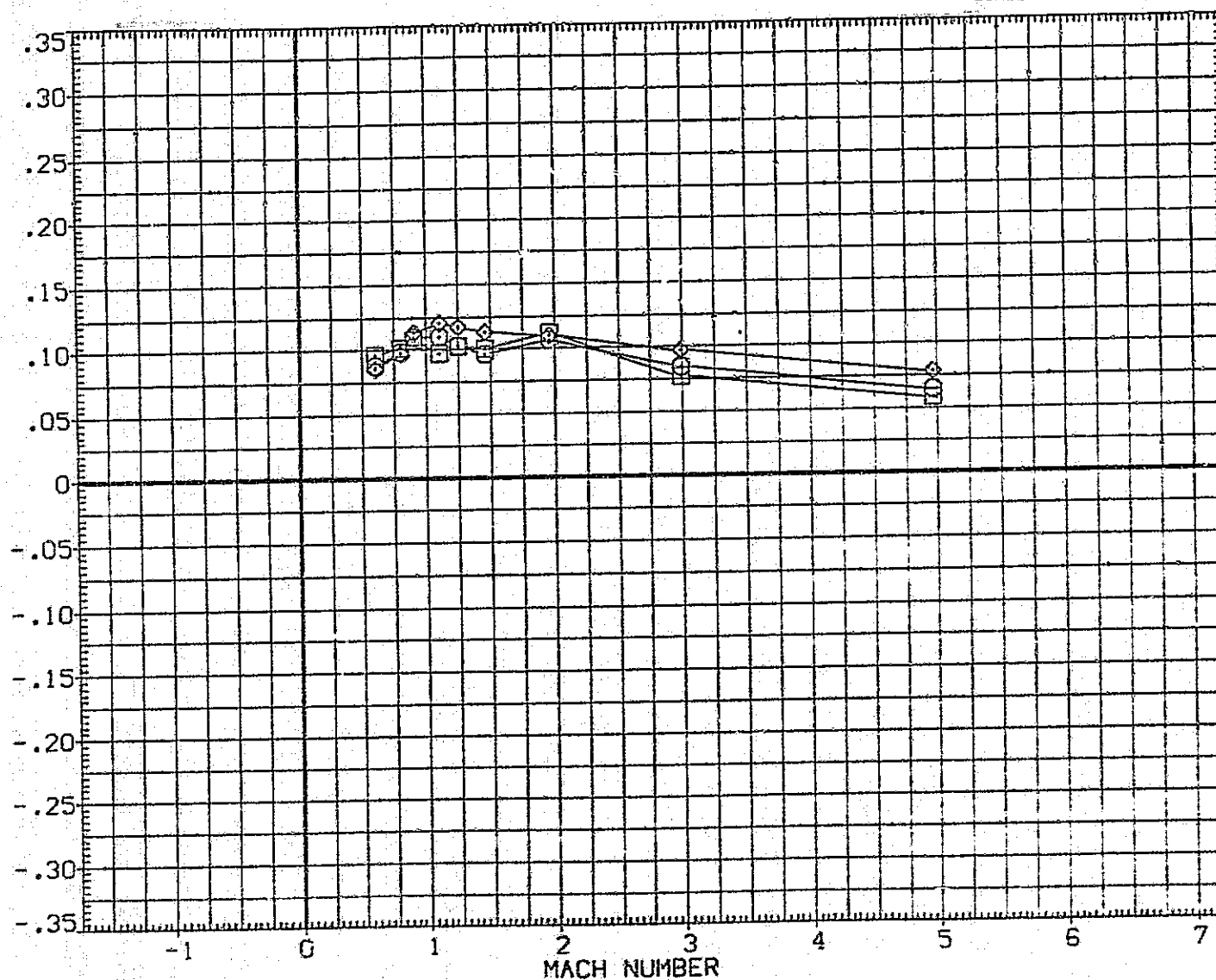


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(1) BETA = 6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ALPHA
(VIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	.000
(VIC009)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	5.000
(VIC010)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

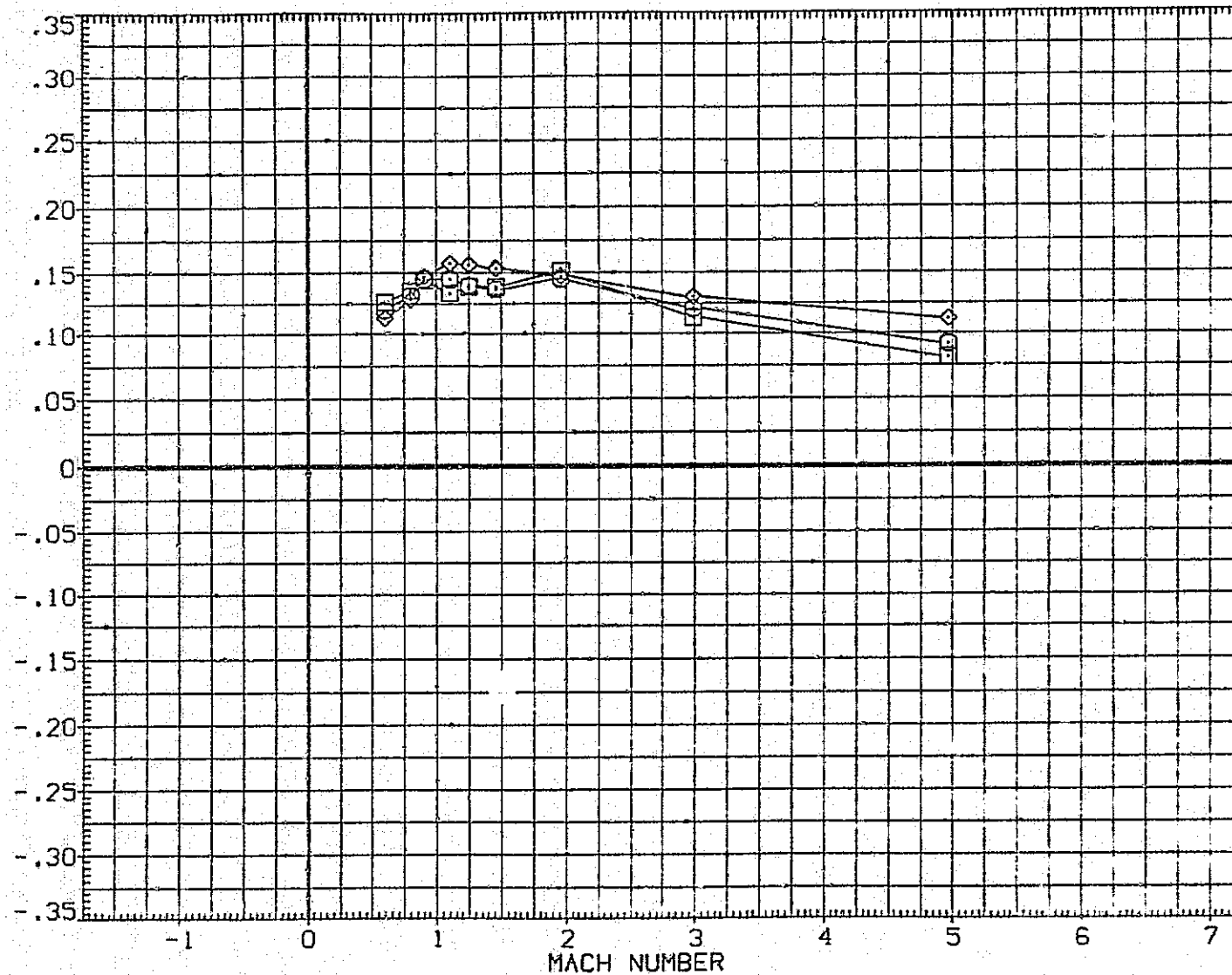


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(J)BETA = 8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)
(VIC009)	MSFC 594(1A33) 740TS (T1P1S1P201)
(VIC010)	MSFC 594(1A33) 740TS (T1P1S1P201)

ORB STING
ORB STING
ORB STING

ALPHA
.000
5.000
-5.000

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

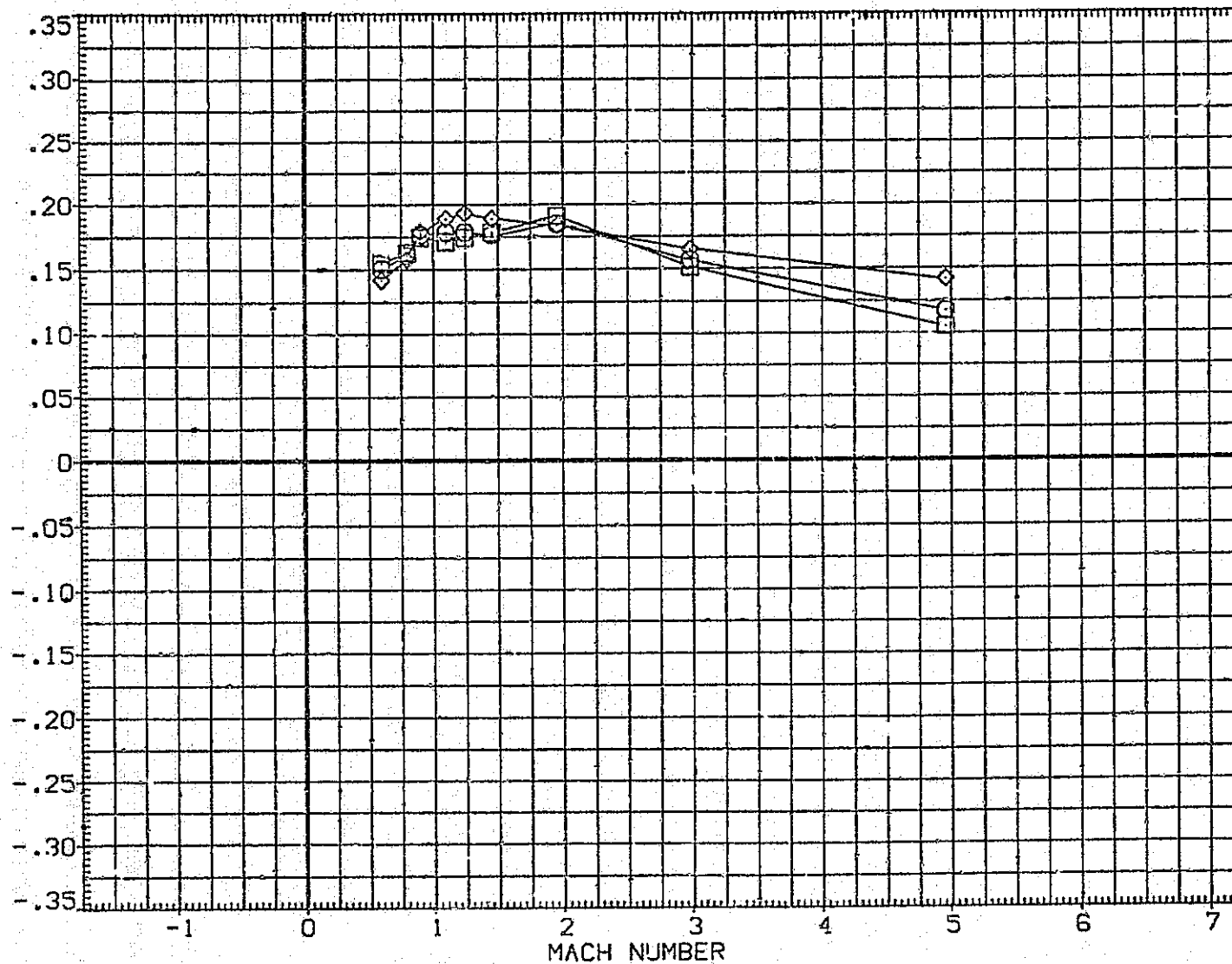


FIG 7 LAUNCH VEHICLE-FIRST STAGE-LATERAL/DIRECTIONAL CHARACTERISTICS
(K)BETA = 10.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC007)	□	MSFC 594(A33) 740TS (T1P1S1P201)	ORB STING
(VIC017)	◇	MSFC 594(A33) 740TS (T1P1S1P201)	FORKED STING
(VIC019)	◇	MSFC 594(A33) 740TS (T1P1S1P201)	FORKED STING

REFERENCE INFORMATION

SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

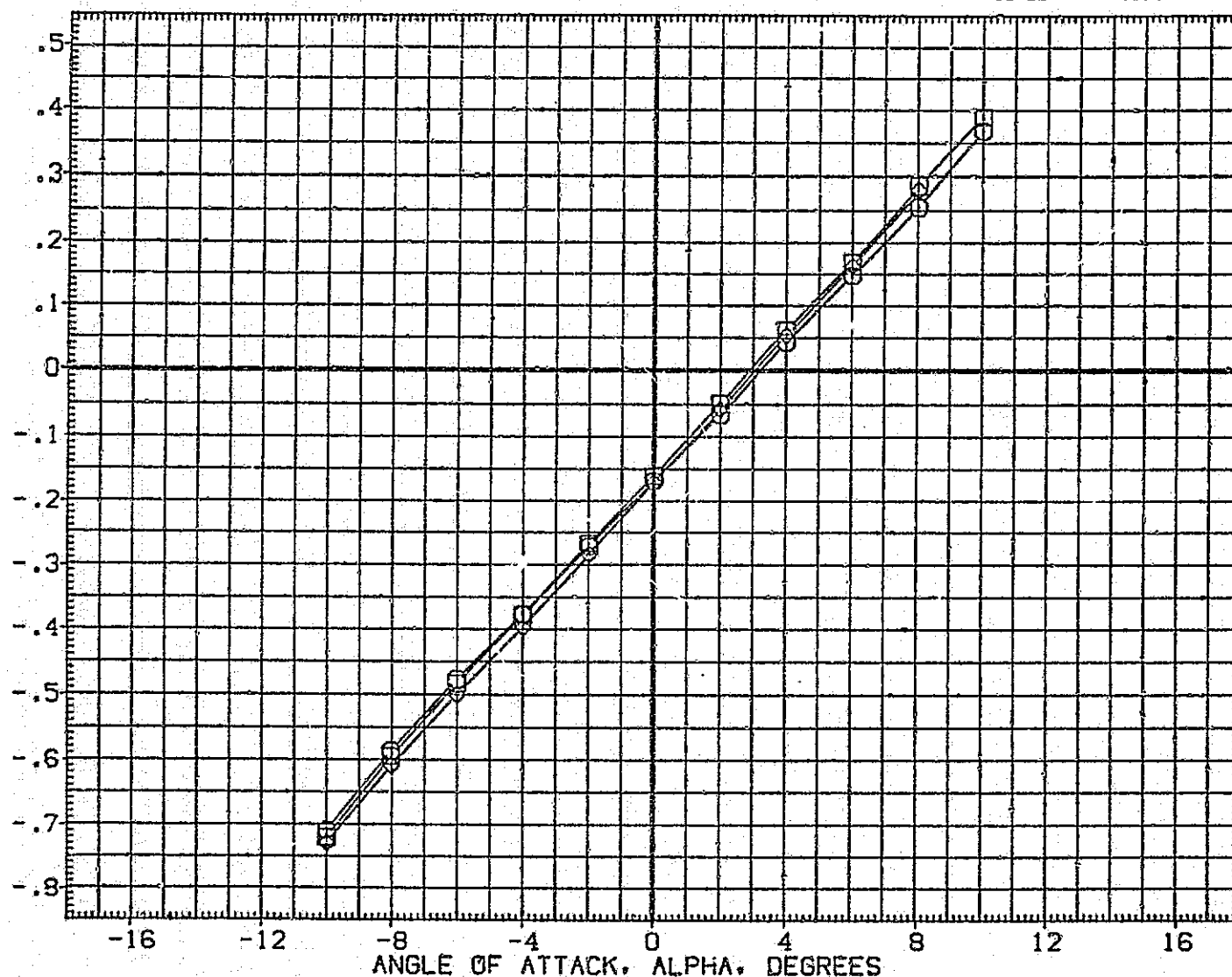


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

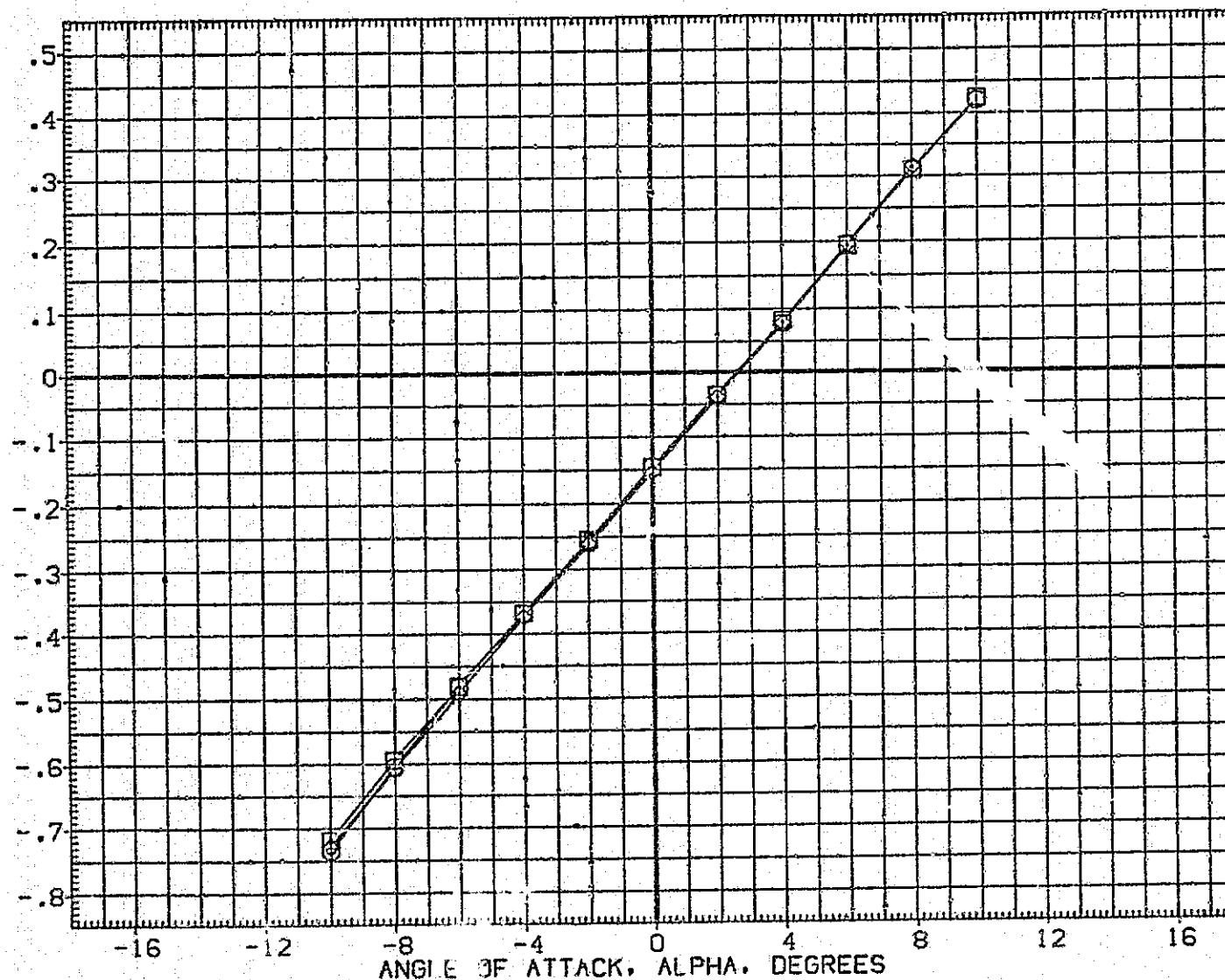


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(1A33) 740TS (TIP1SIP201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIP1SIP201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIP1SIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

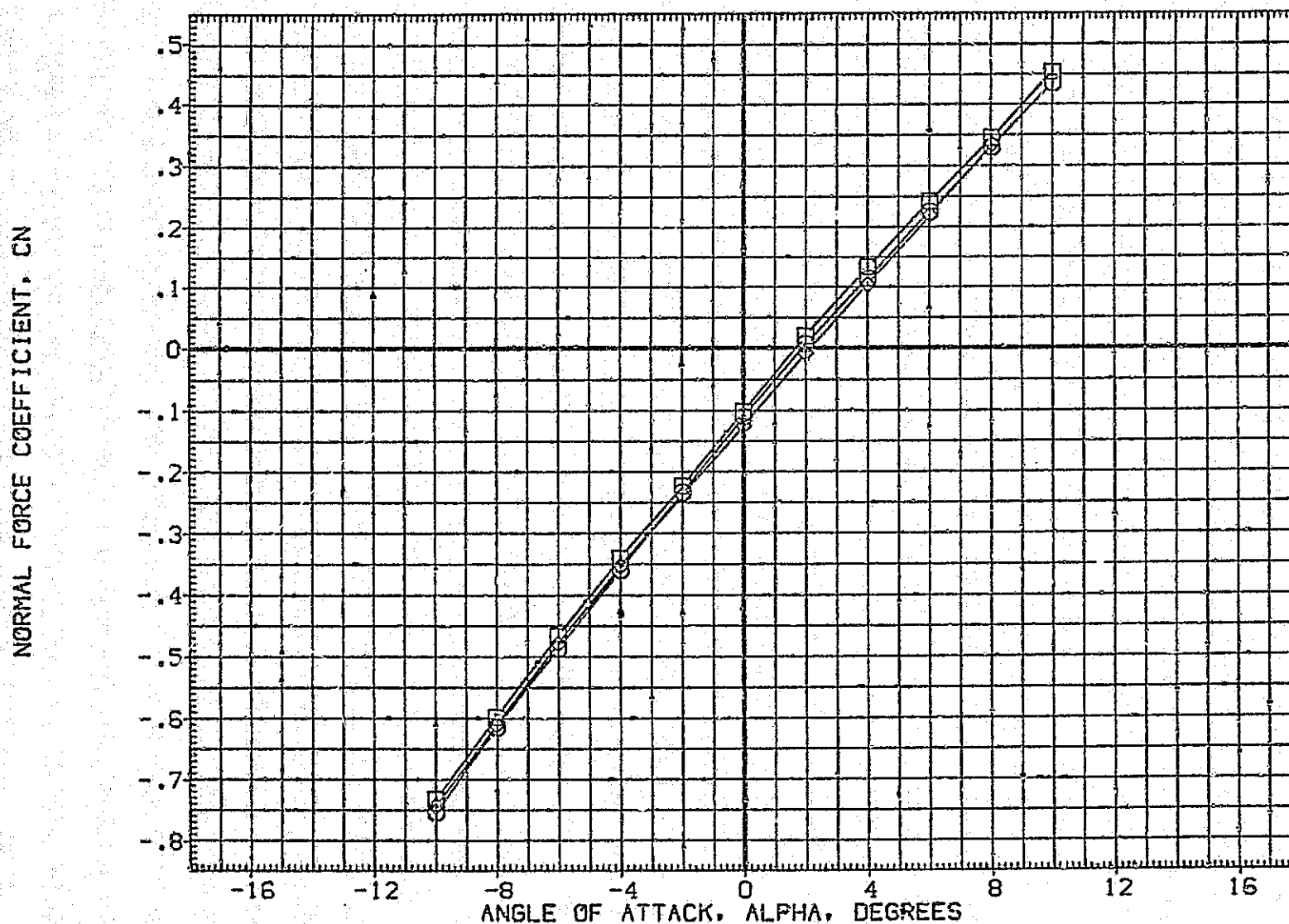


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING

REFERENCE INFORMATION

SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

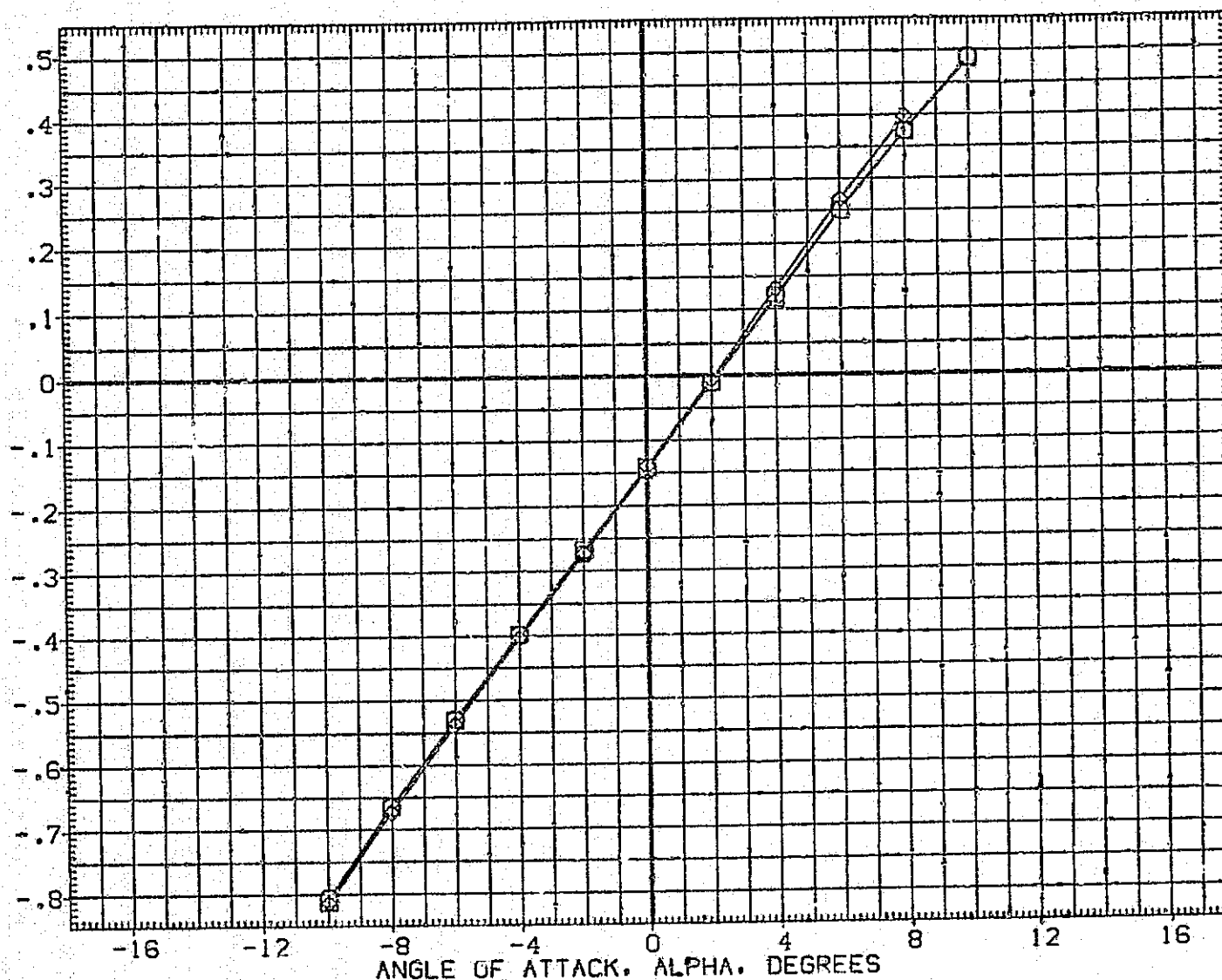


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(D)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	CRB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	CRB STING
(VIC017)	MSFC 594(1A33) 740TS (T1P1S1P201)	FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (T1P1S1P201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

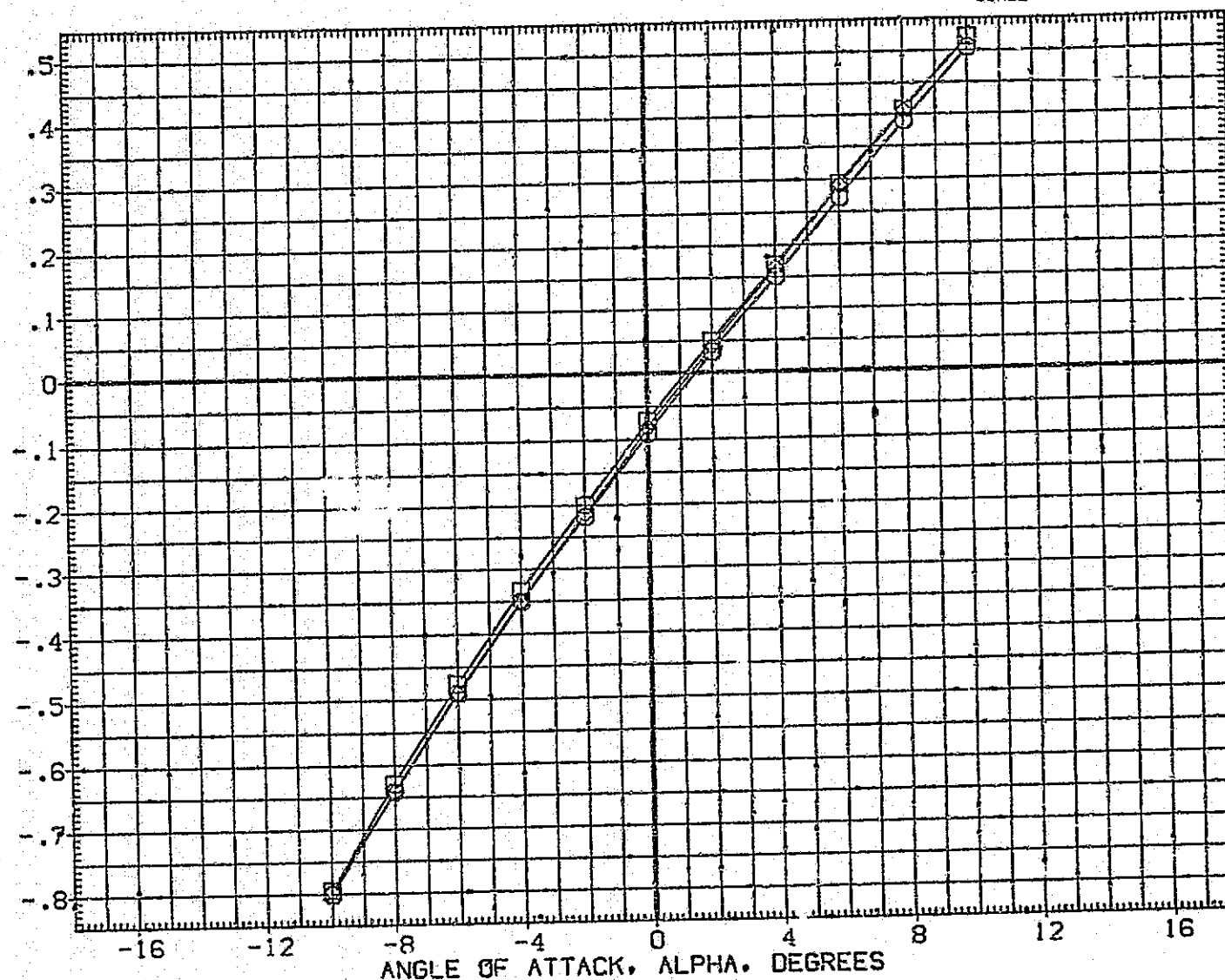


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(E)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIG STING
(VIC007)	MSFC 594(IA33) 740TS (TIP1S1P201)	ORIG STING
(VIC017)	MSFC 594(IA33) 740TS (TIP1S1P201)	FORKED STING
(VIC019)	MSFC 594(IA33) 740TS (TIP1S1P201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

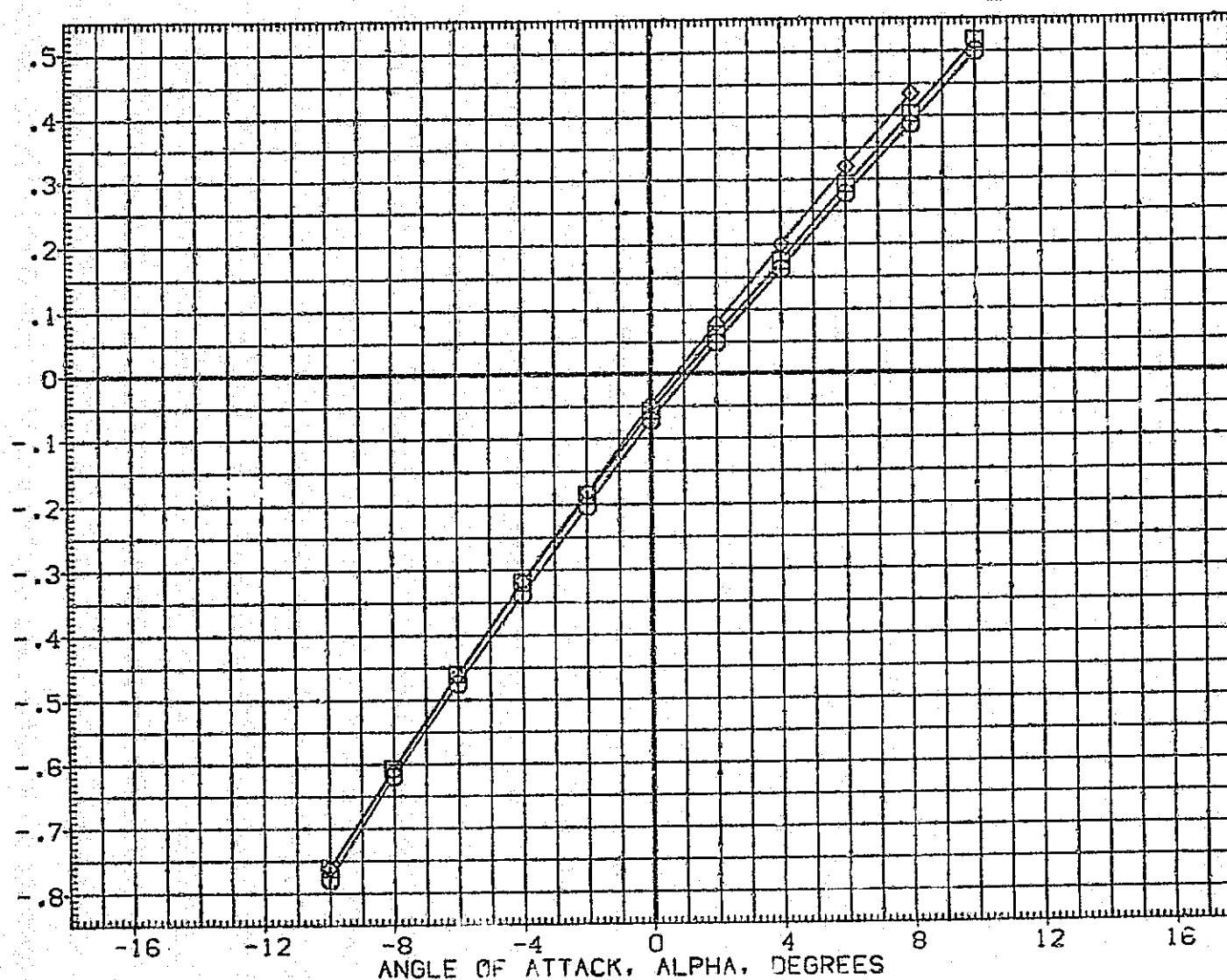


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(F)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIG STING
(VIC007)	MSFC 594(1A33) 740TS (TIP1S1P201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIP1S1P201)	FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIP1S1P2C1)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

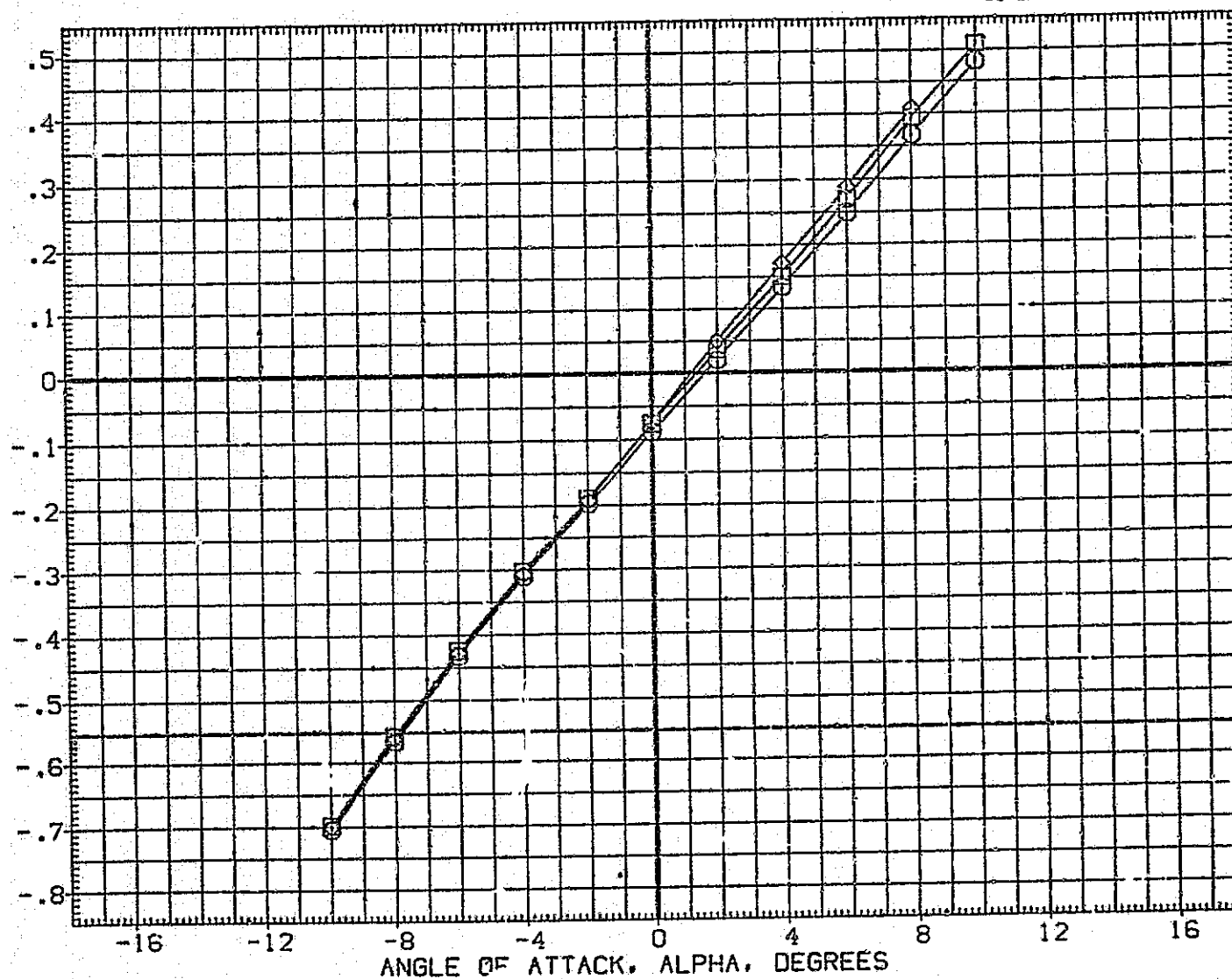





FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(G)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) 	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC017) 	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC019) 	DATA NOT AVAILABLE

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

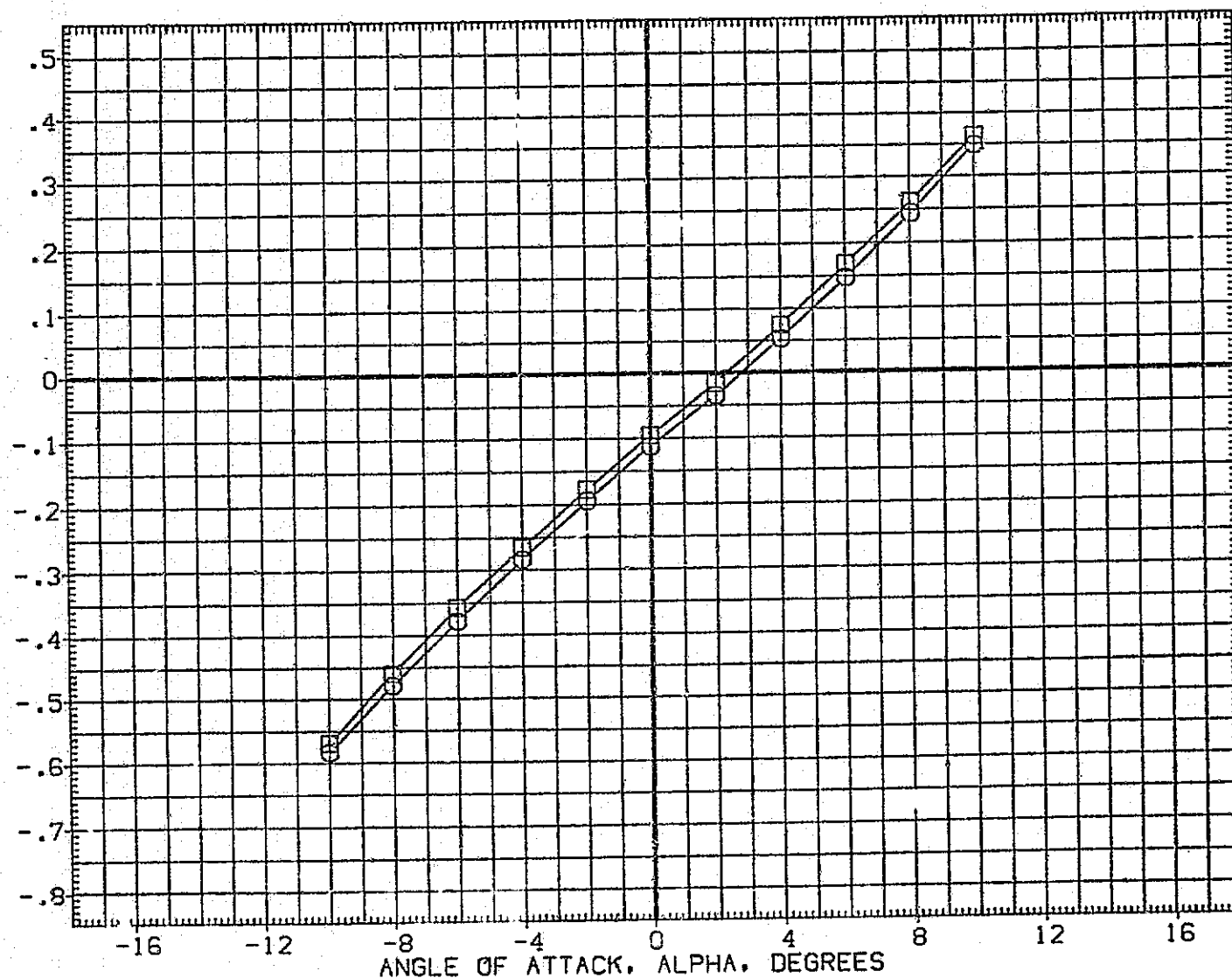


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(H)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC S94(IA33) 740TS (TIP1S1P201) ORB STING
(VIC017)	MSFC S94(IA33) 740TS (TIP1S1P201) FORKED STING
(VIC019)	MSFC S94(IA33) 740TS (TIP1S1P201) FORKED STING

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

NORMAL FORCE COEFFICIENT, CN

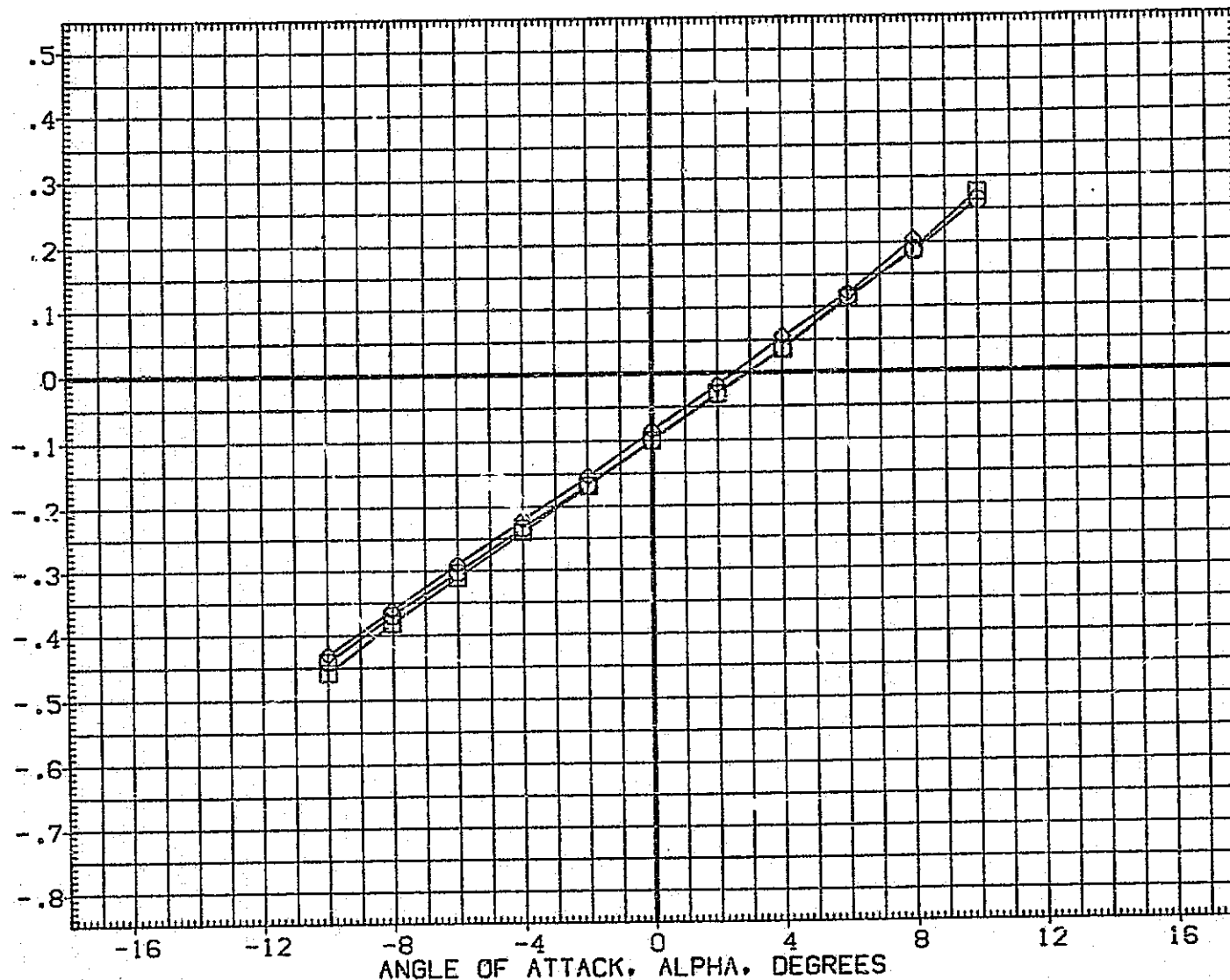


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(I)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(A33) 740TS (TIPISIP201) ORB STING
(VIC017)	MSFC 594(A33) 740TS (TIPISIP201) FORKED STING
(VIC019)	MSFC 594(A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

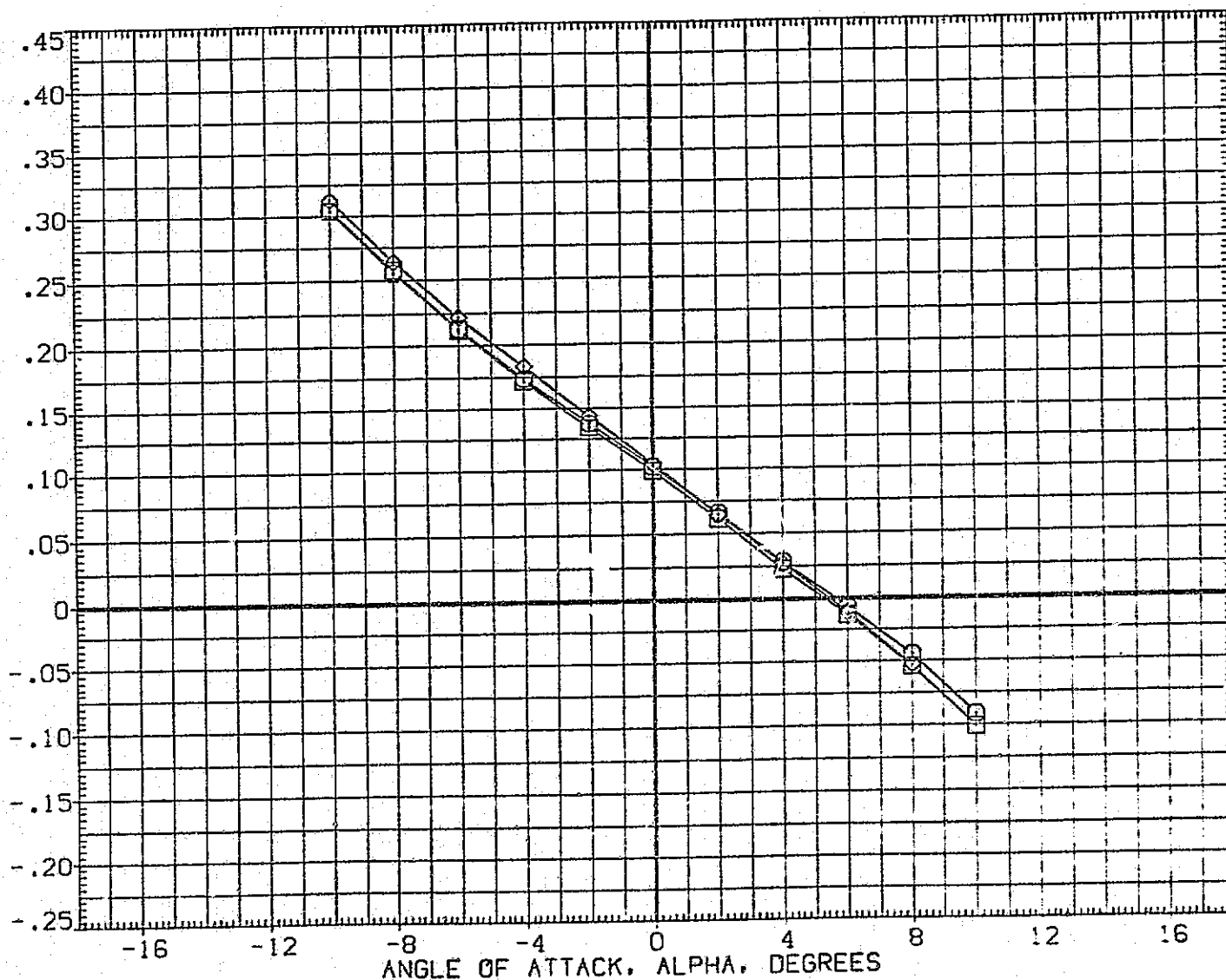


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

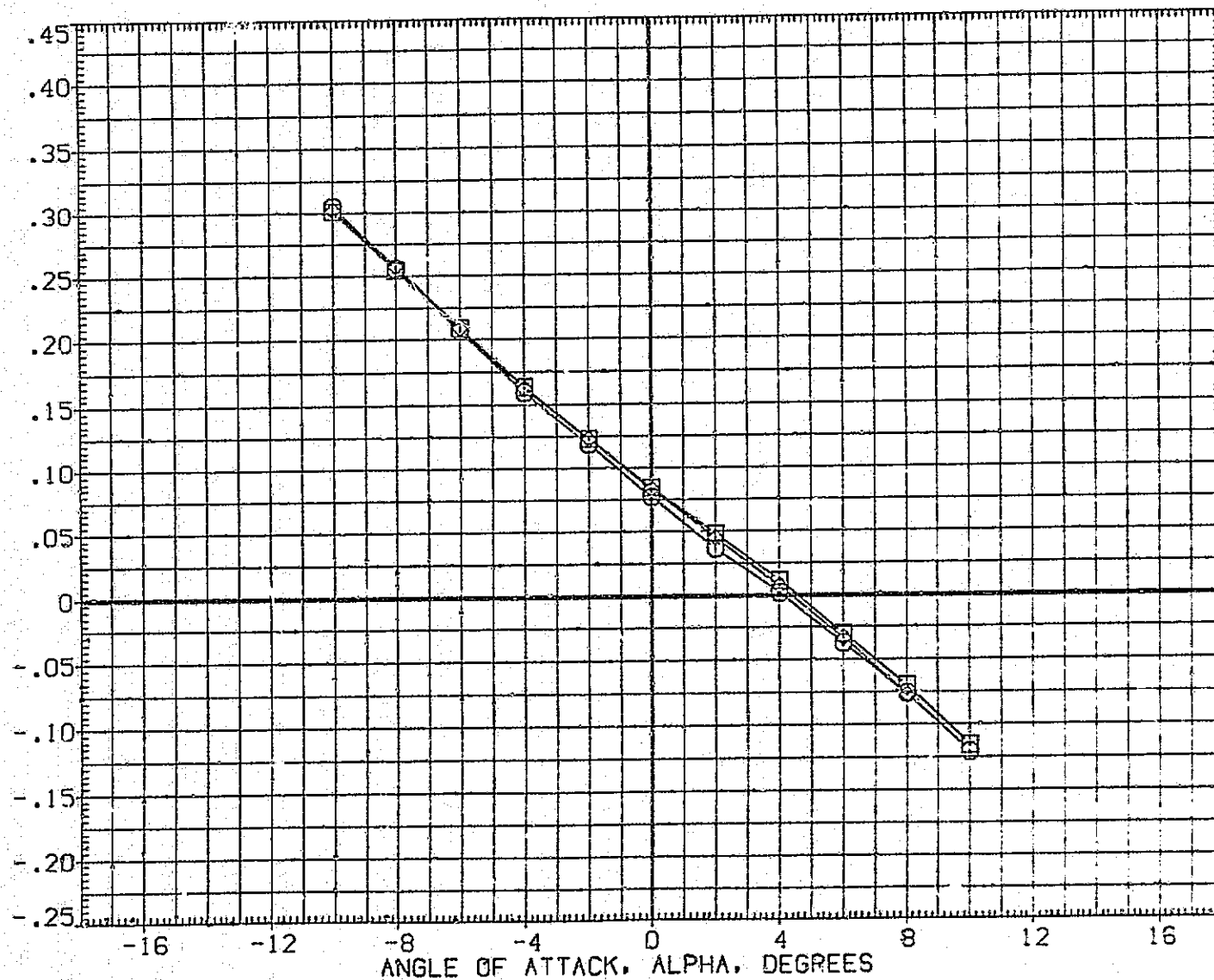


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) □	MSFC 594(IA33) 740TS (TIPISIP201) ORB STING
(VIC017) □	MSFC 594(IA33) 740TS (TIPISIP201) FORKED STING
(VIC019) ◇	MSFC 594(IA33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

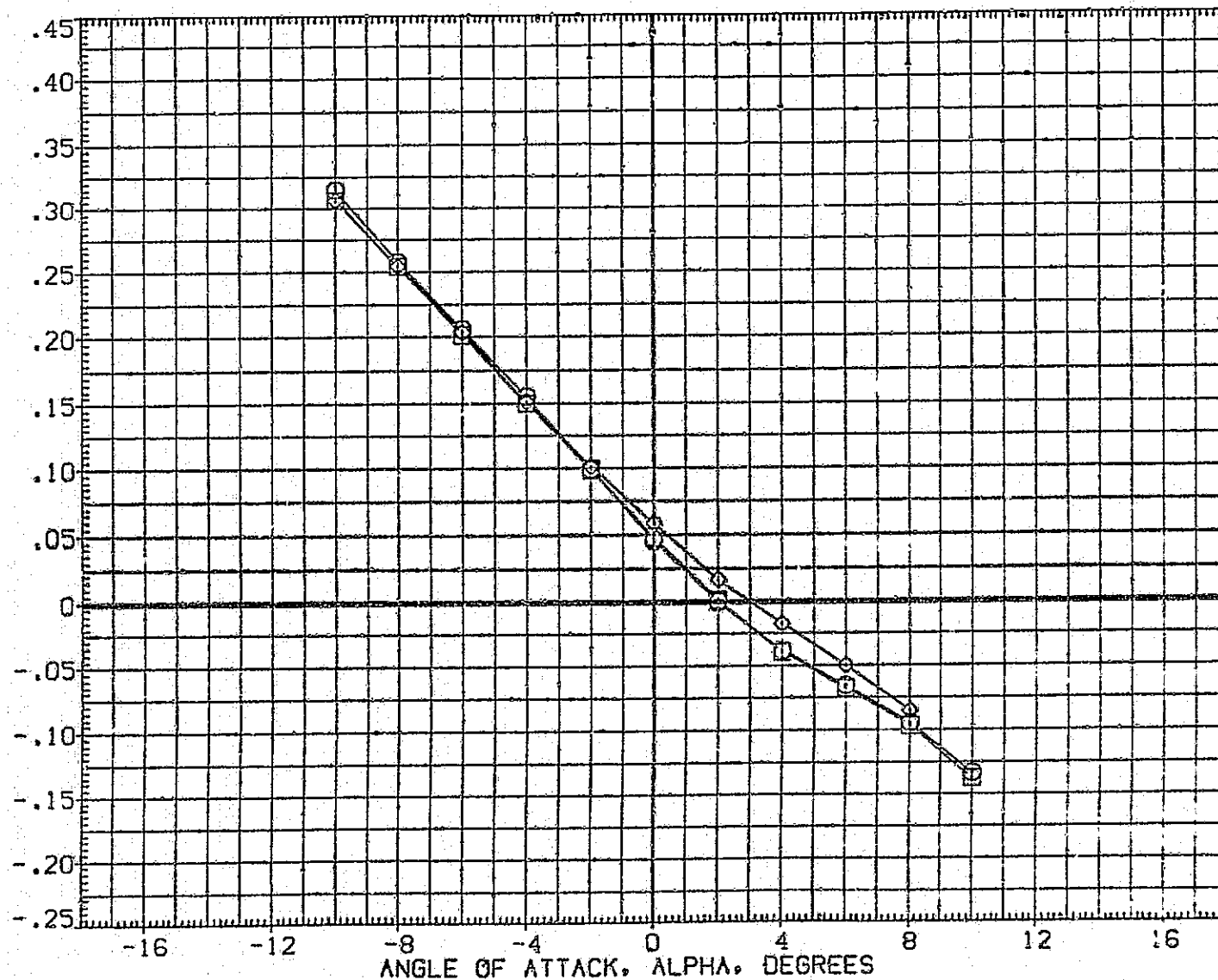


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC007)	MSFC 594(I A33) 740TS (TIPISIP201)	ORB STING
(VIC017)	MSFC 594(I A33) 740TS (TIPISIP201)	FORKED STING
(VIC019)	MSFC 594(I A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2650.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

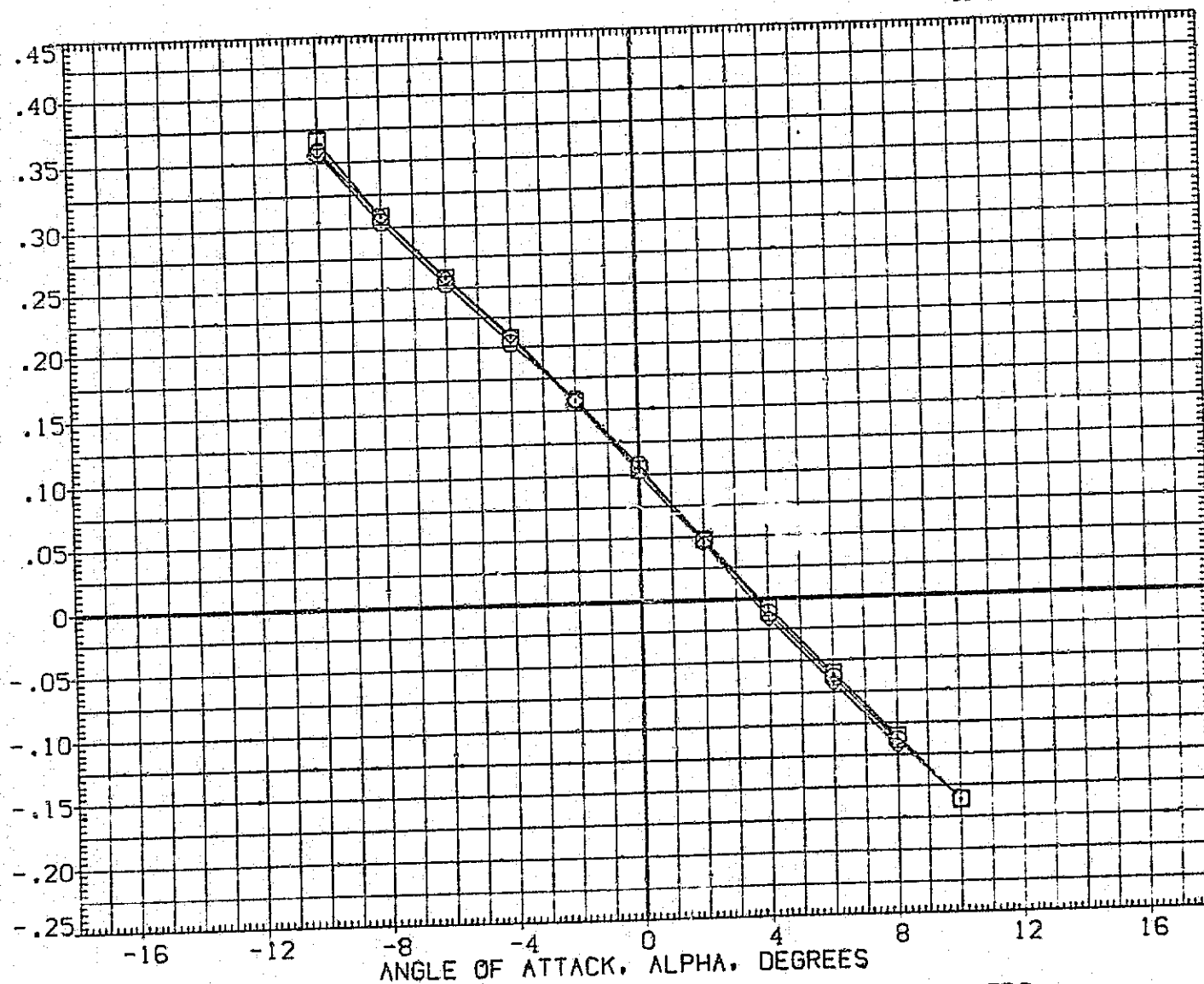


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(0)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (T1P1S1P201)	FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (T1P1S1P201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

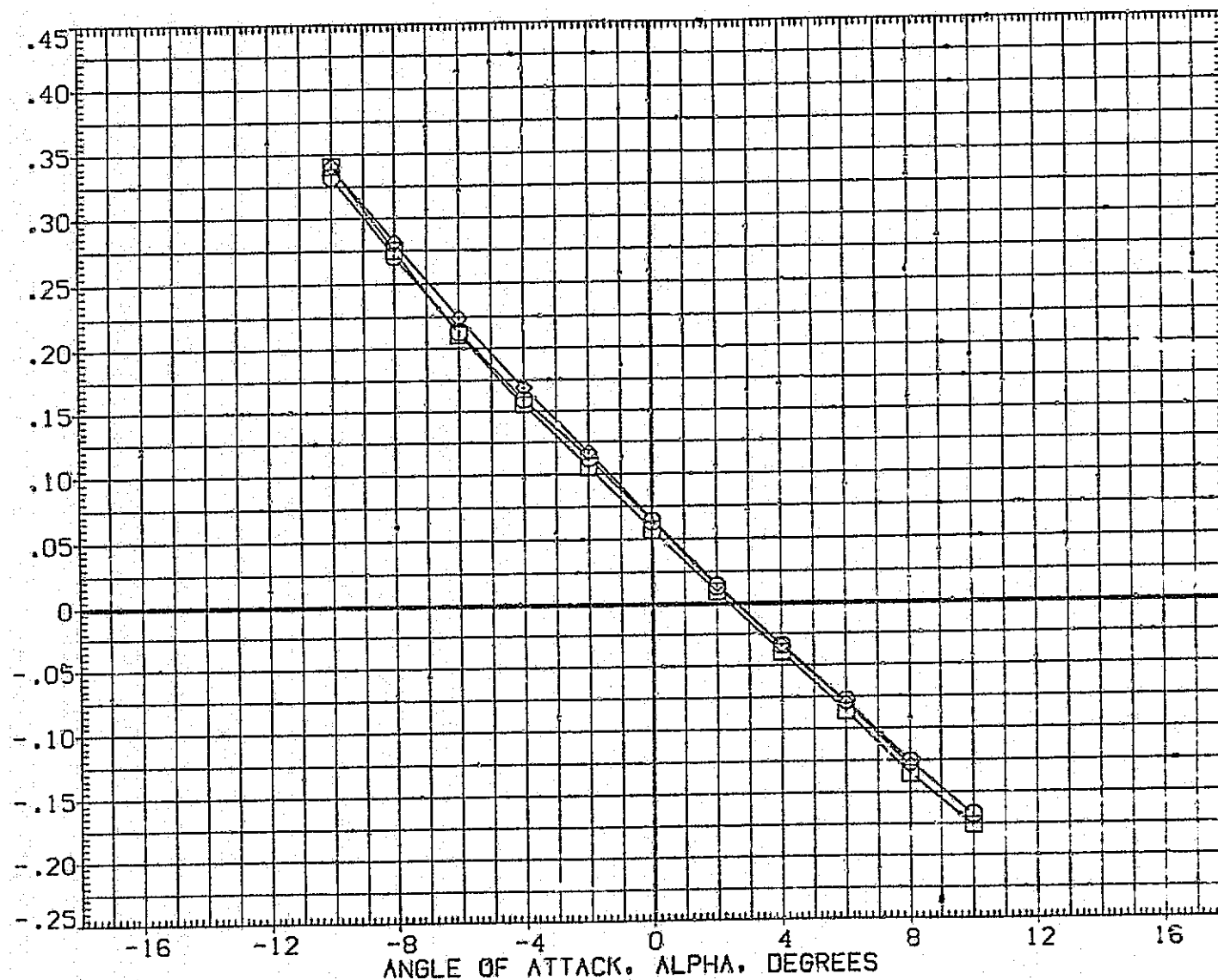


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(E)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

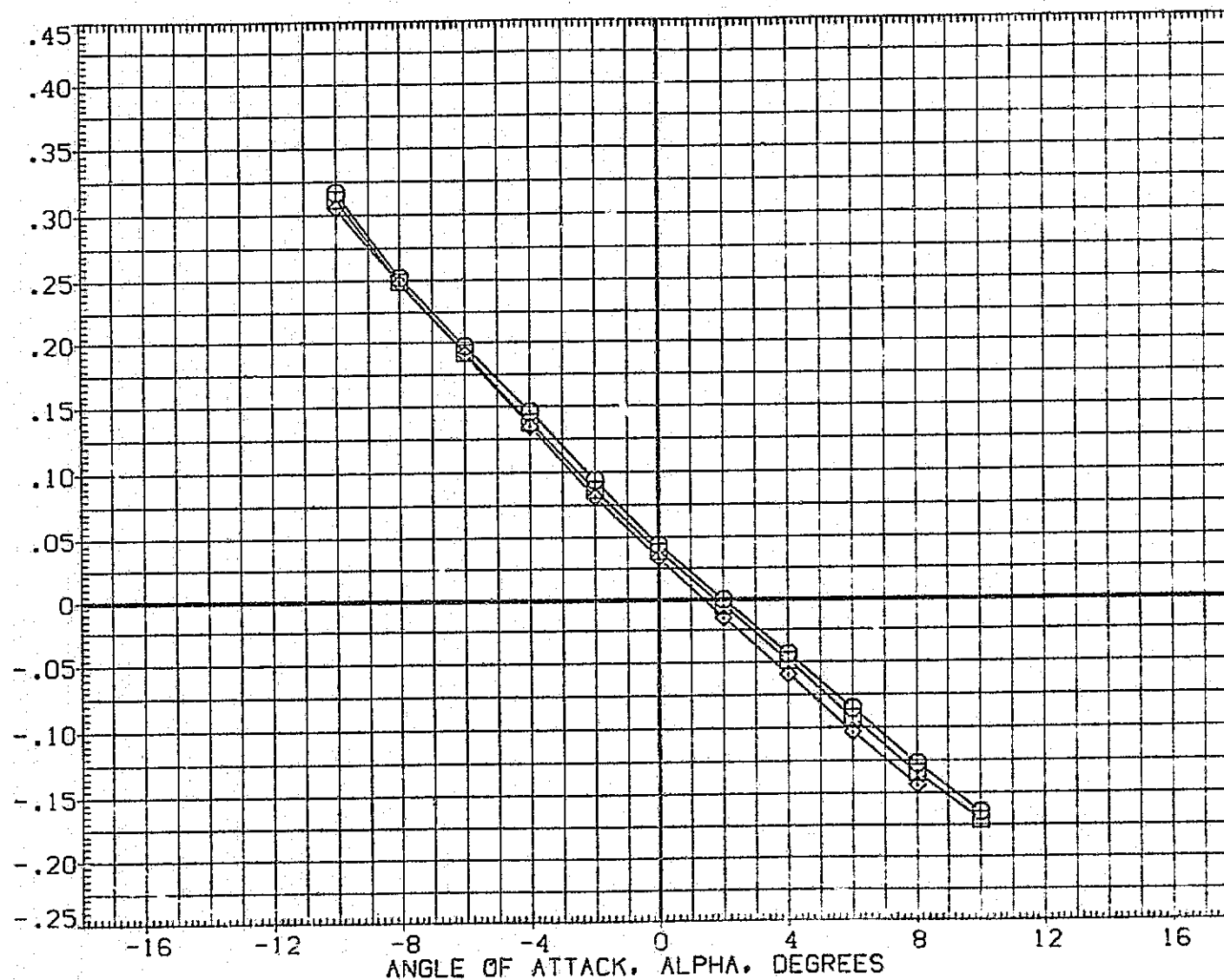


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(F)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

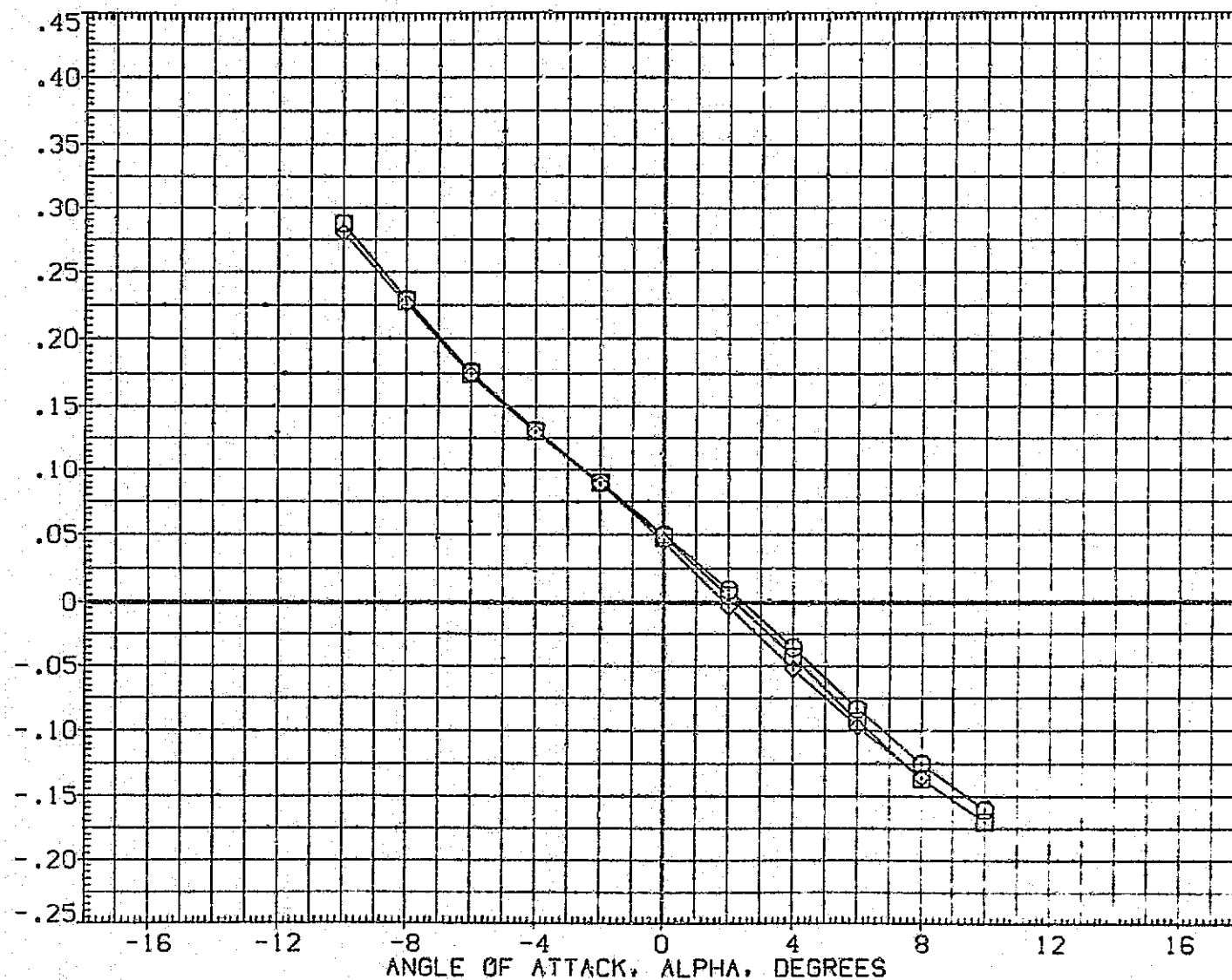


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(G)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC007)	MSFC S94(1A33) 740TS (TIP1S1P201)	FORKED STING
(VIC017)	MSFC S94(1A33) 740TS (TIP1S1P201)	
(VIC019)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

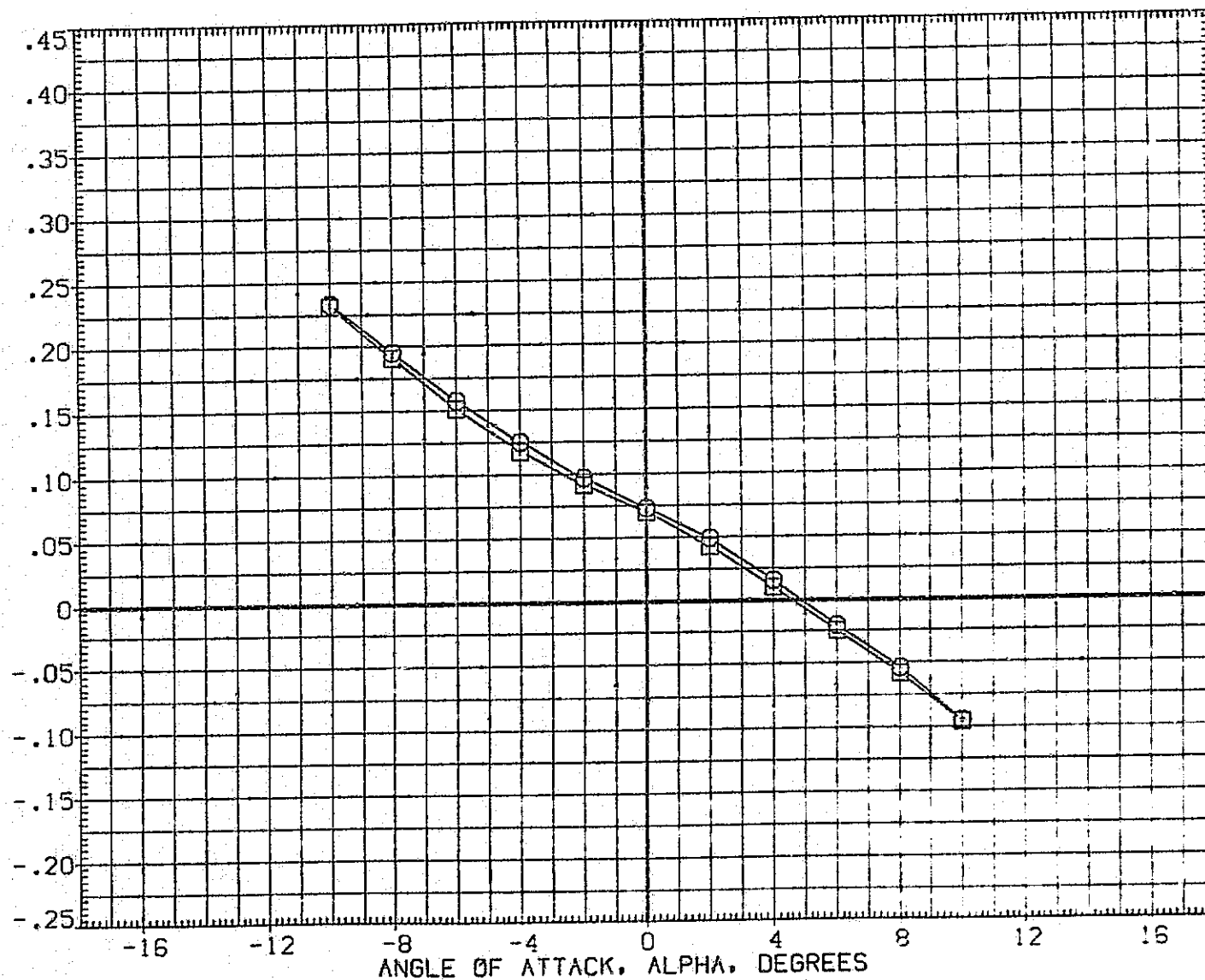


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(H)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) □	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC017) □	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC019) ◇	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

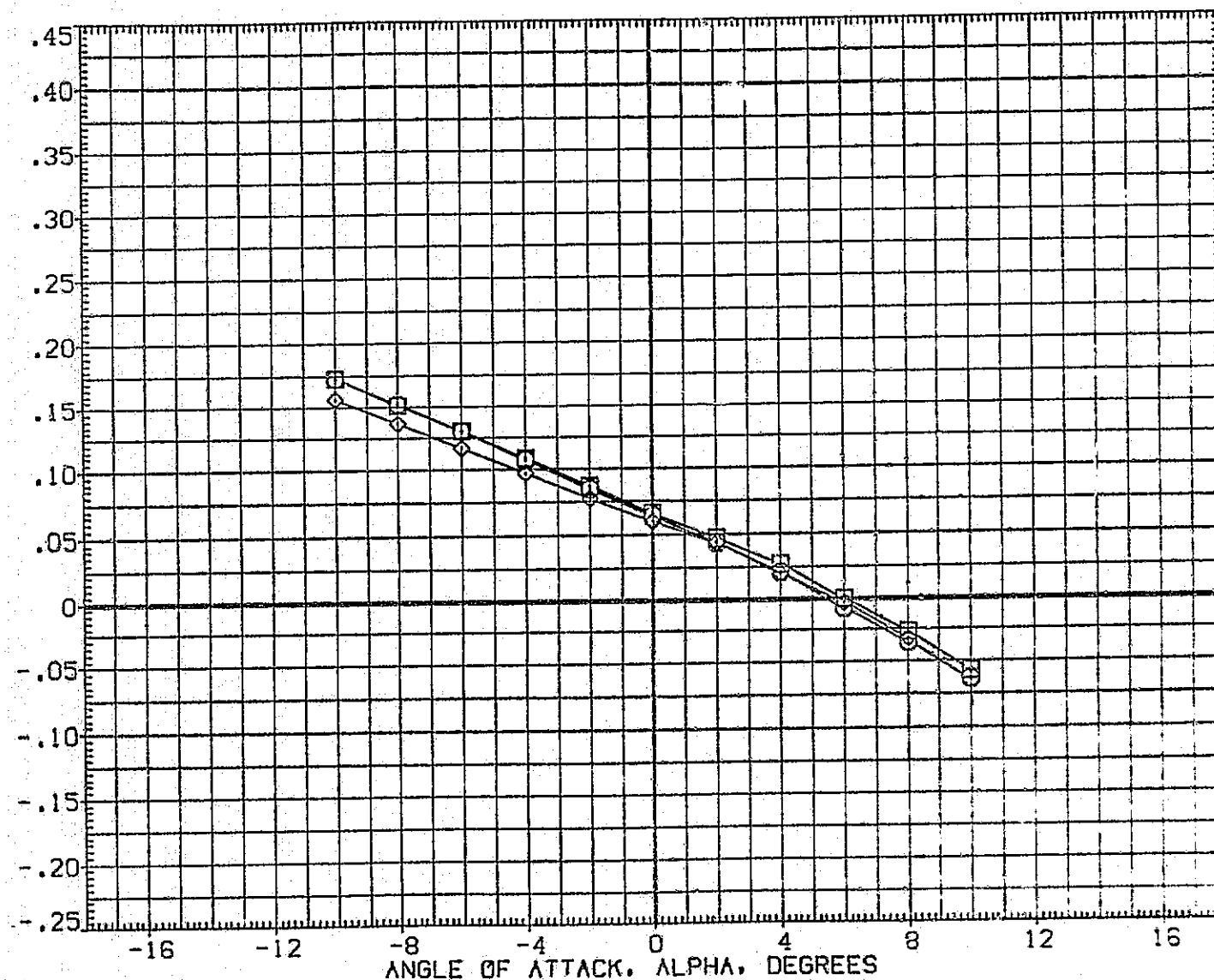





FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(1)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) 	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC017) 	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC019) 	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

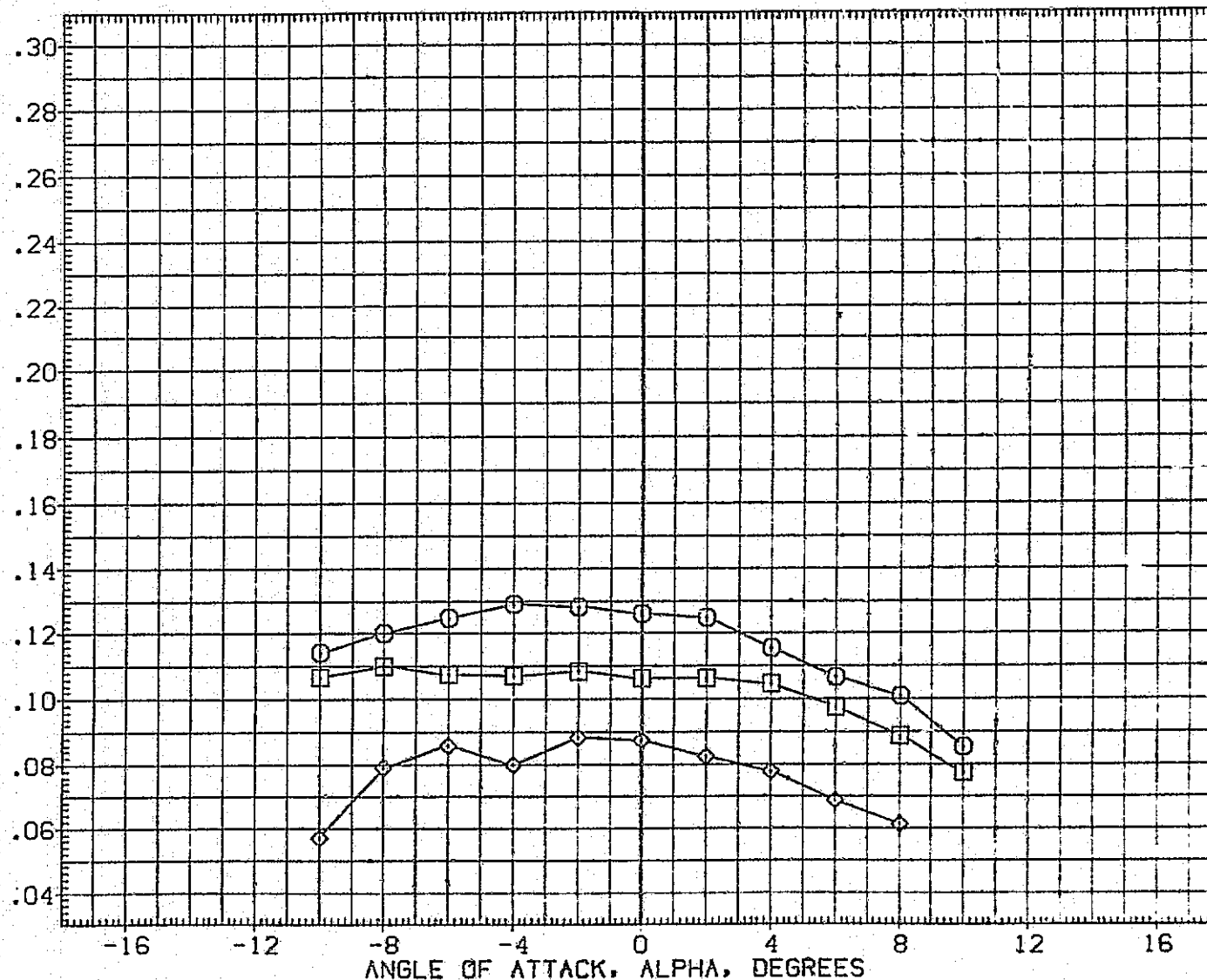


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) ○	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC017) □	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC019) ◇	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0010	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

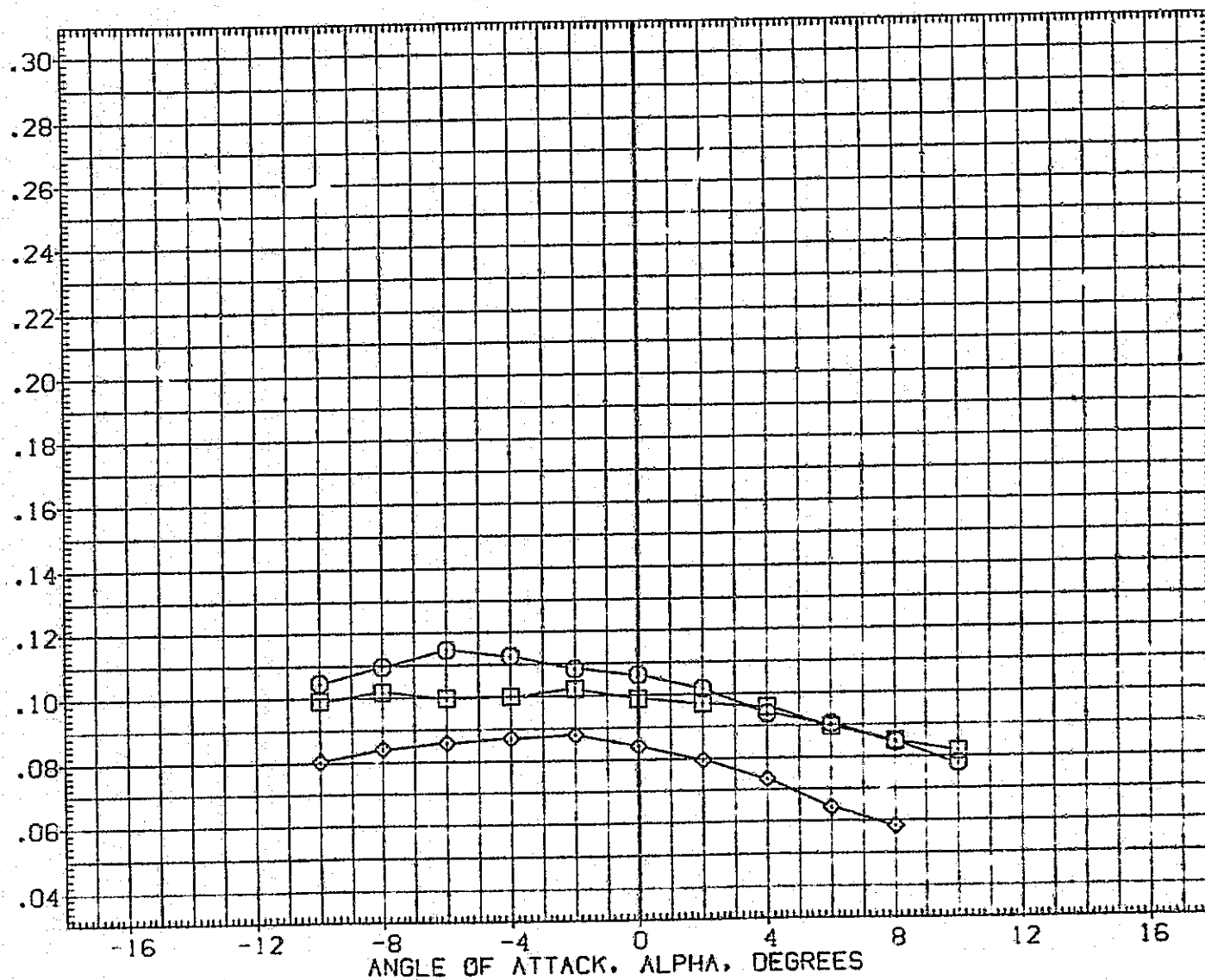


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(V1C007) ○	MSFC 594(1A33) 740TS (T1P1SIP201) ORB STING
(V1C017) □	MSFC 594(1A33) 740TS (T1P1SIP201) FORKED STING
(V1C019) ◇	MSFC 594(1A33) 740TS (T1P1SIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

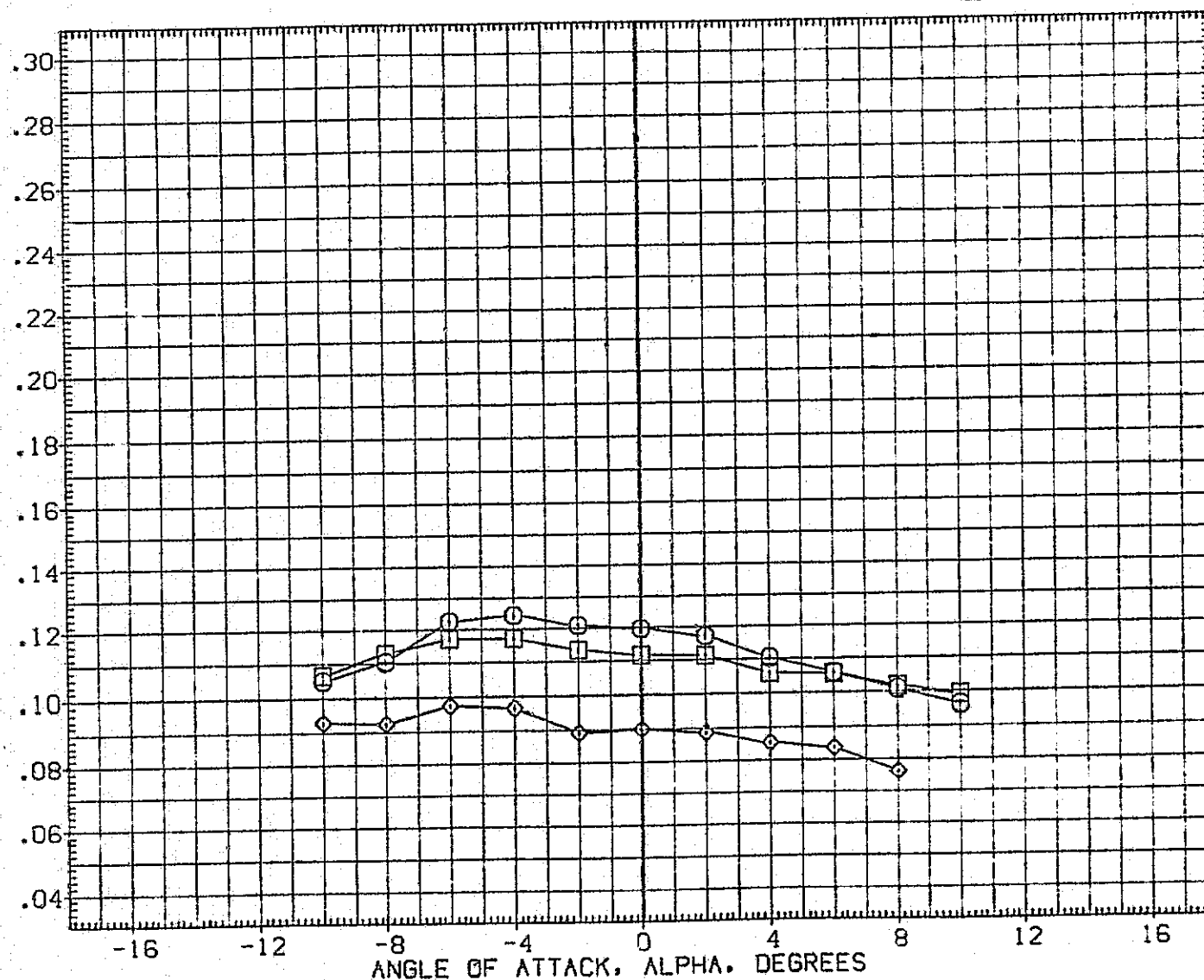


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SPEF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

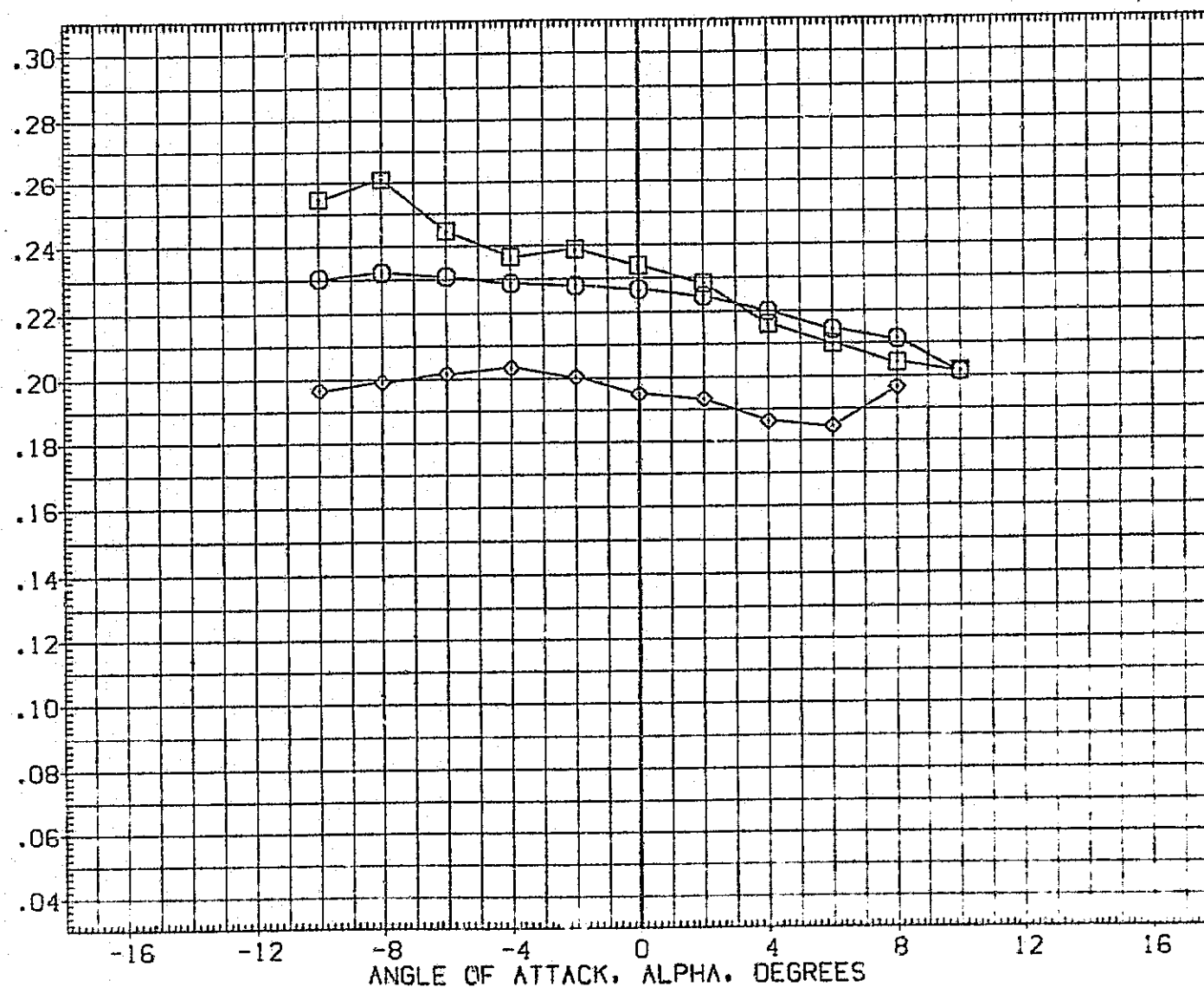


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(D)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

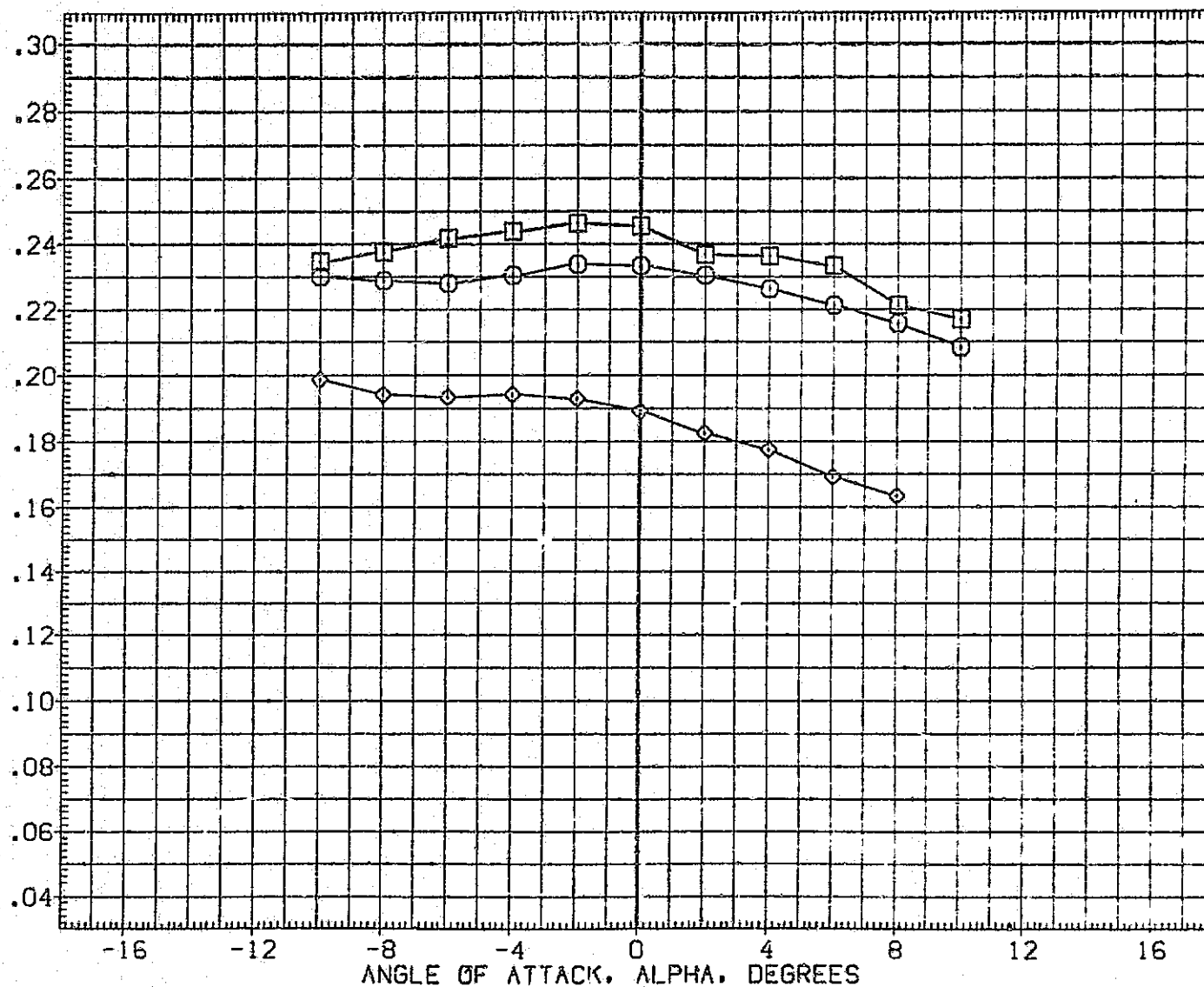


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(E)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC007)	MSFC S94(1A33) 740TS (TIPISIP201)	ORB STING
(VIC017)	MSFC S94(1A33) 740TS (TIPISIP201)	FORKED STING
(VIC019)	MSFC S94(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

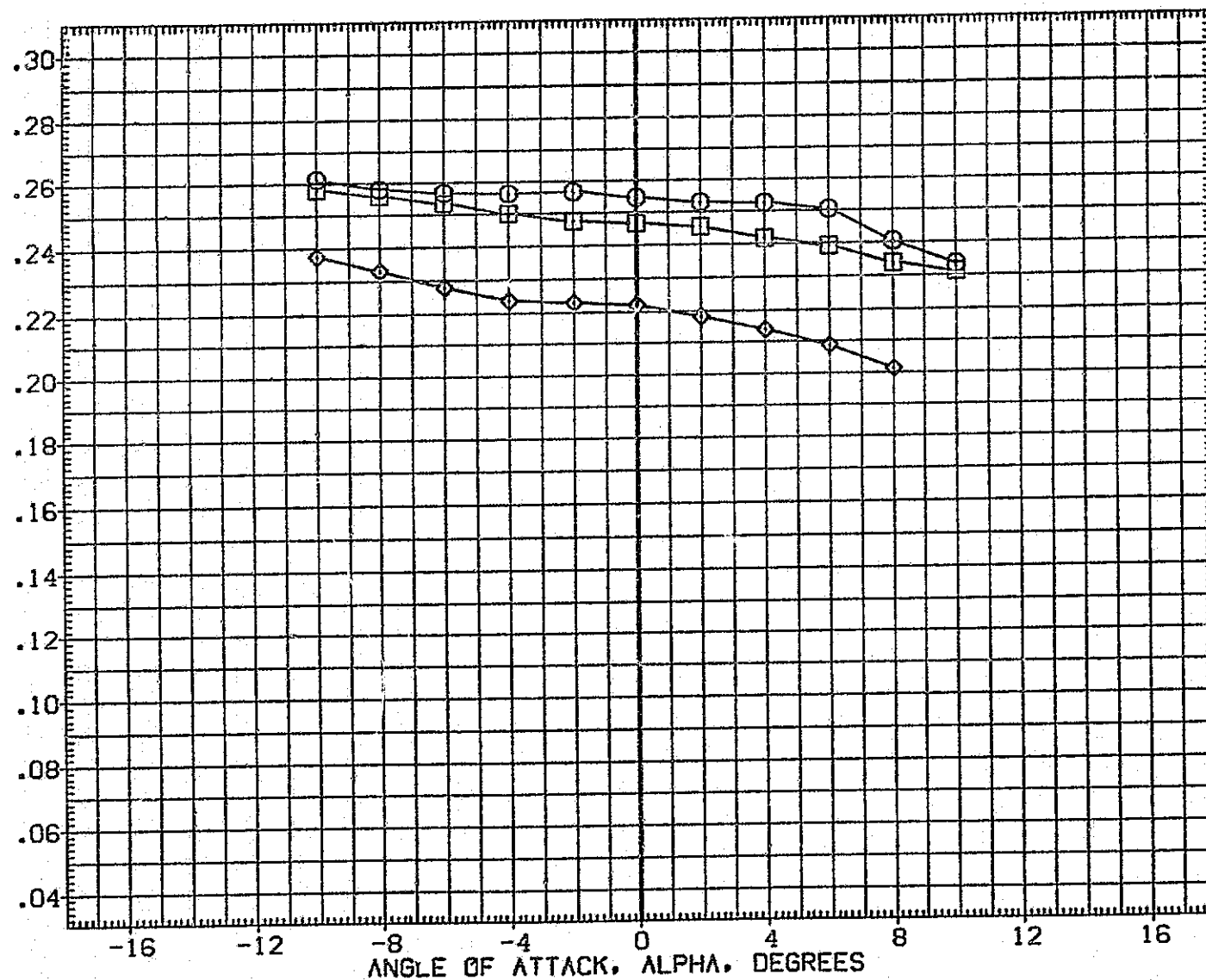


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(F)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
{VIC007}	MSFC 594(1A33) 740TS (TIP1S1P201) ORB STING
{VIC017}	MSFC 594(1A33) 740TS (TIP1S1P201) FORKED STING
{VIC019}	MSFC 594(1A33) 740TS (TIP1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

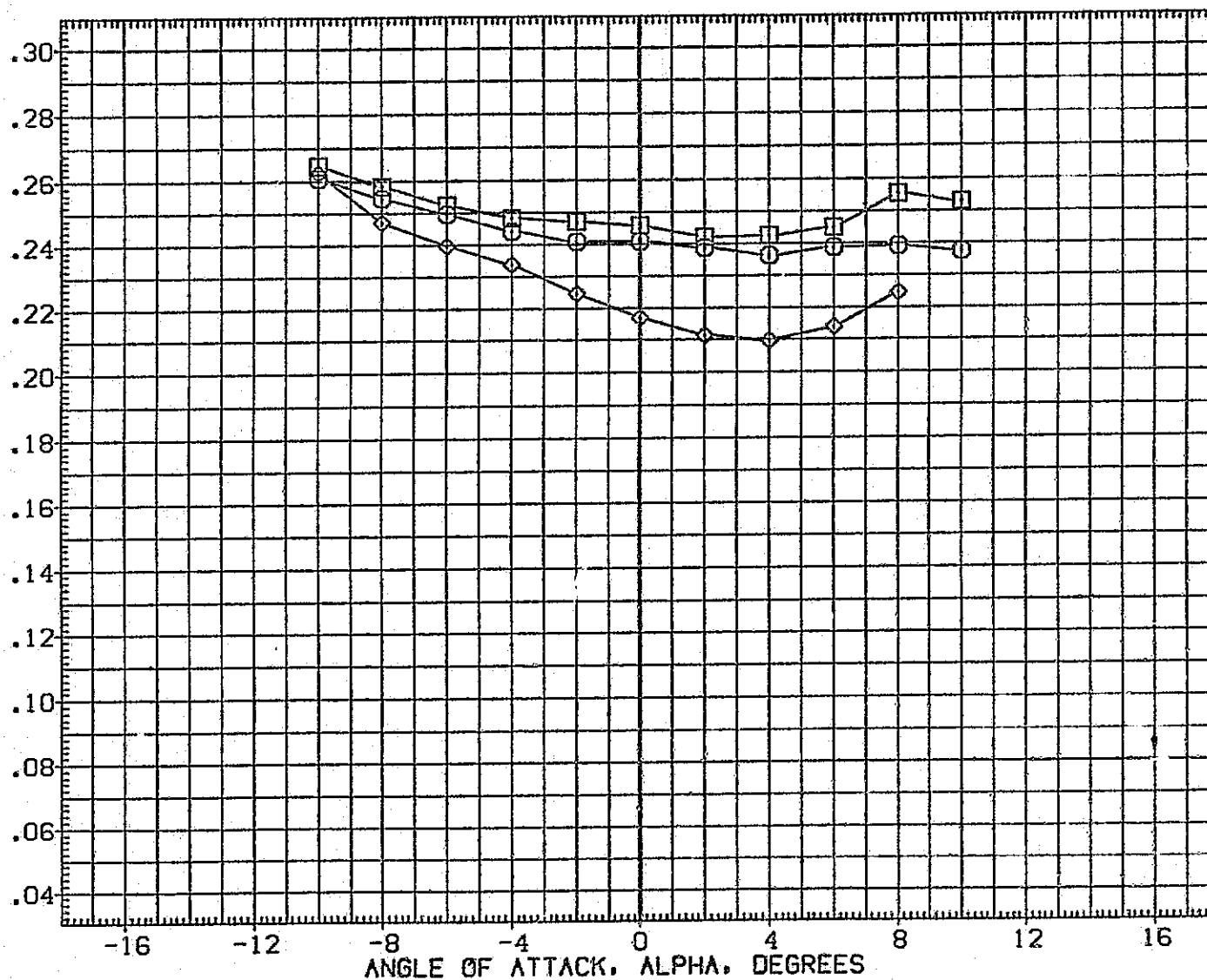


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(G)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIG STING
(VIC007)	MSFC 594(1A33) 740TS (TIP(SIP201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIP(SIP201)	FORKED STING
(VIC019)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

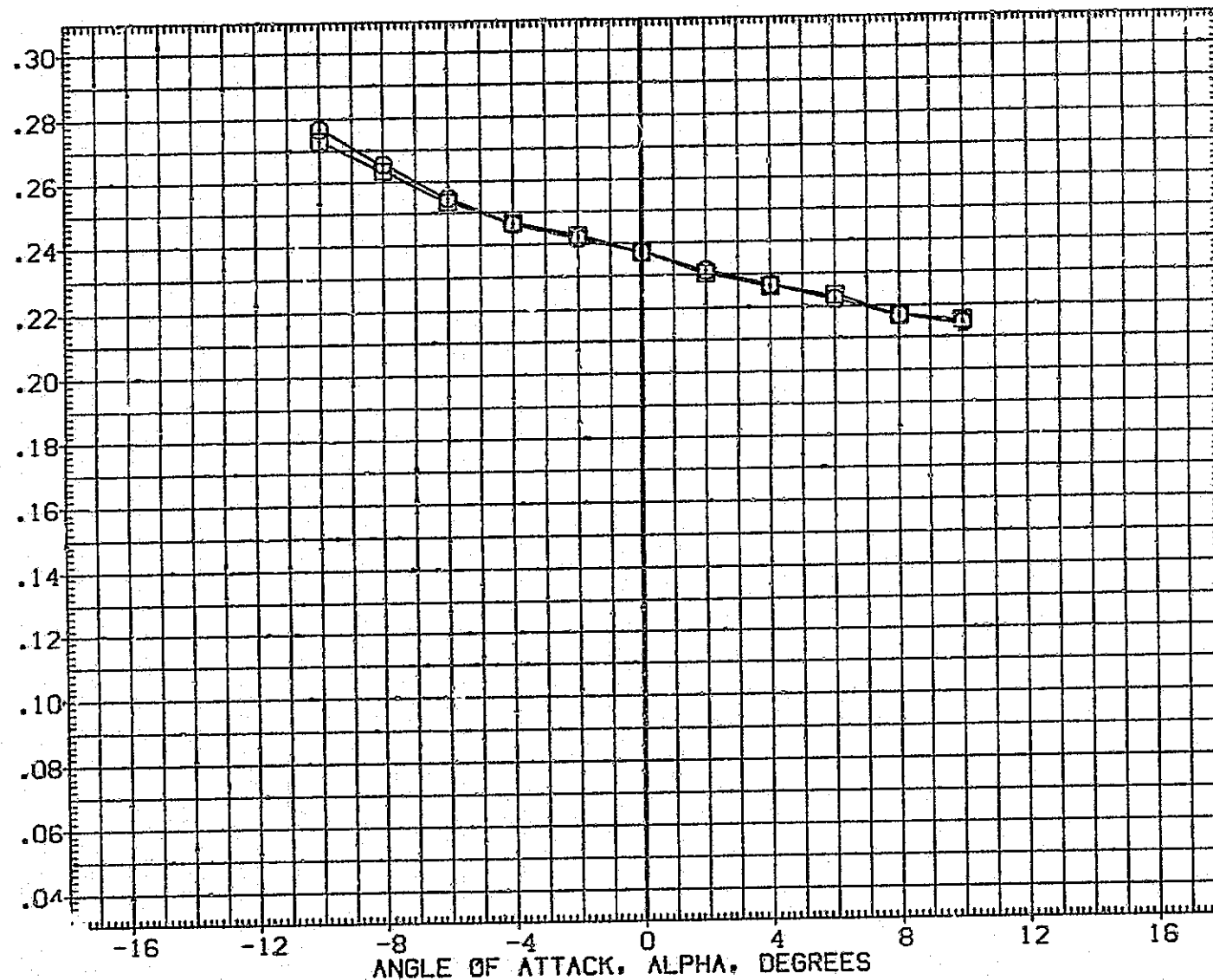


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(H)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
[VIC007] □	MSFC 594(A33) 740TS (TIPISIP201) ORB STING
[VIC017] ○	MSFC 594(A33) 740TS (TIPISIP201) FORKED STING
[VIC019] ◇	MSFC 594(A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0010

FOREBODY AXIAL FORCE COEFFICIENT, CAF

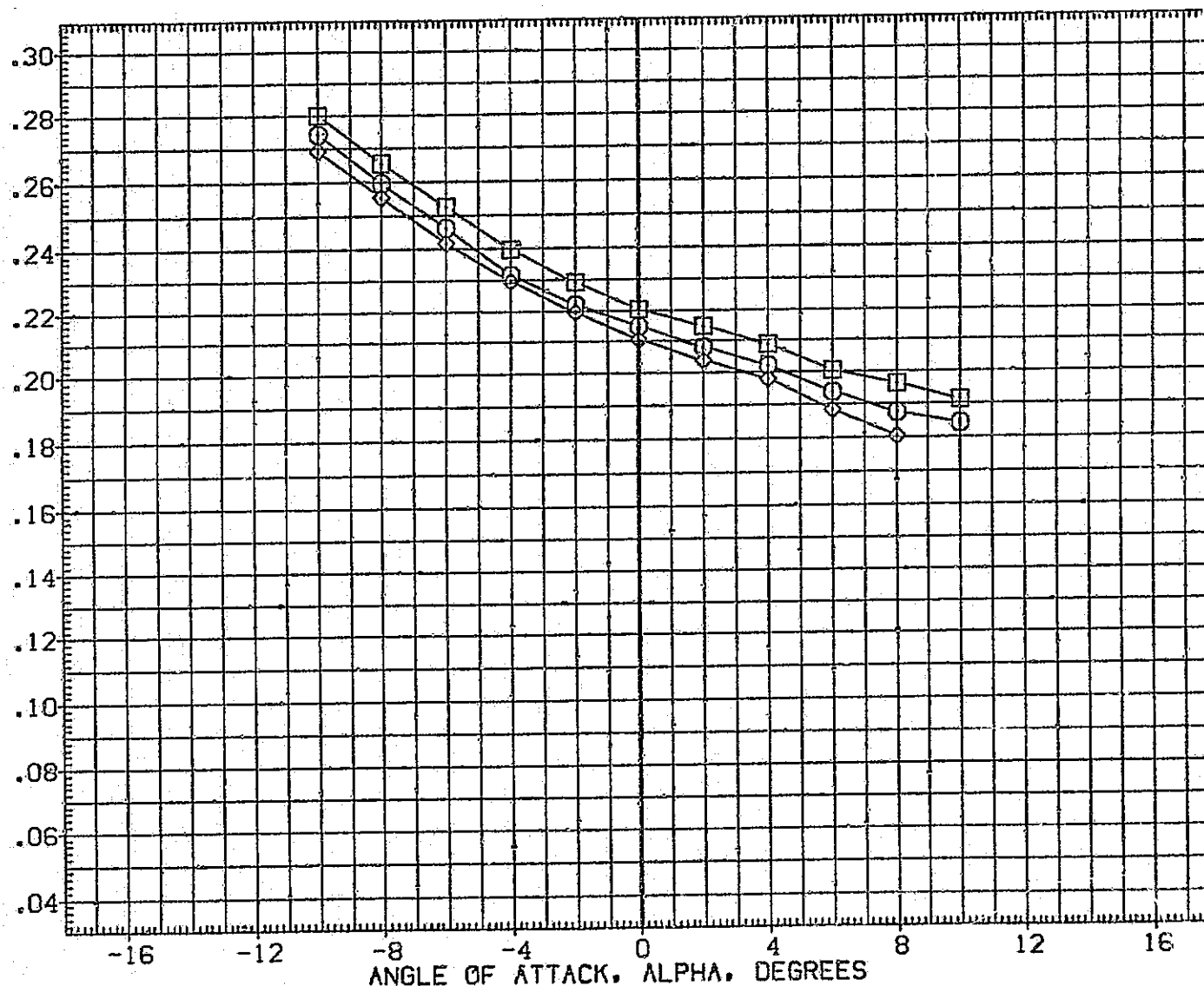


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(1)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201) ORR STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

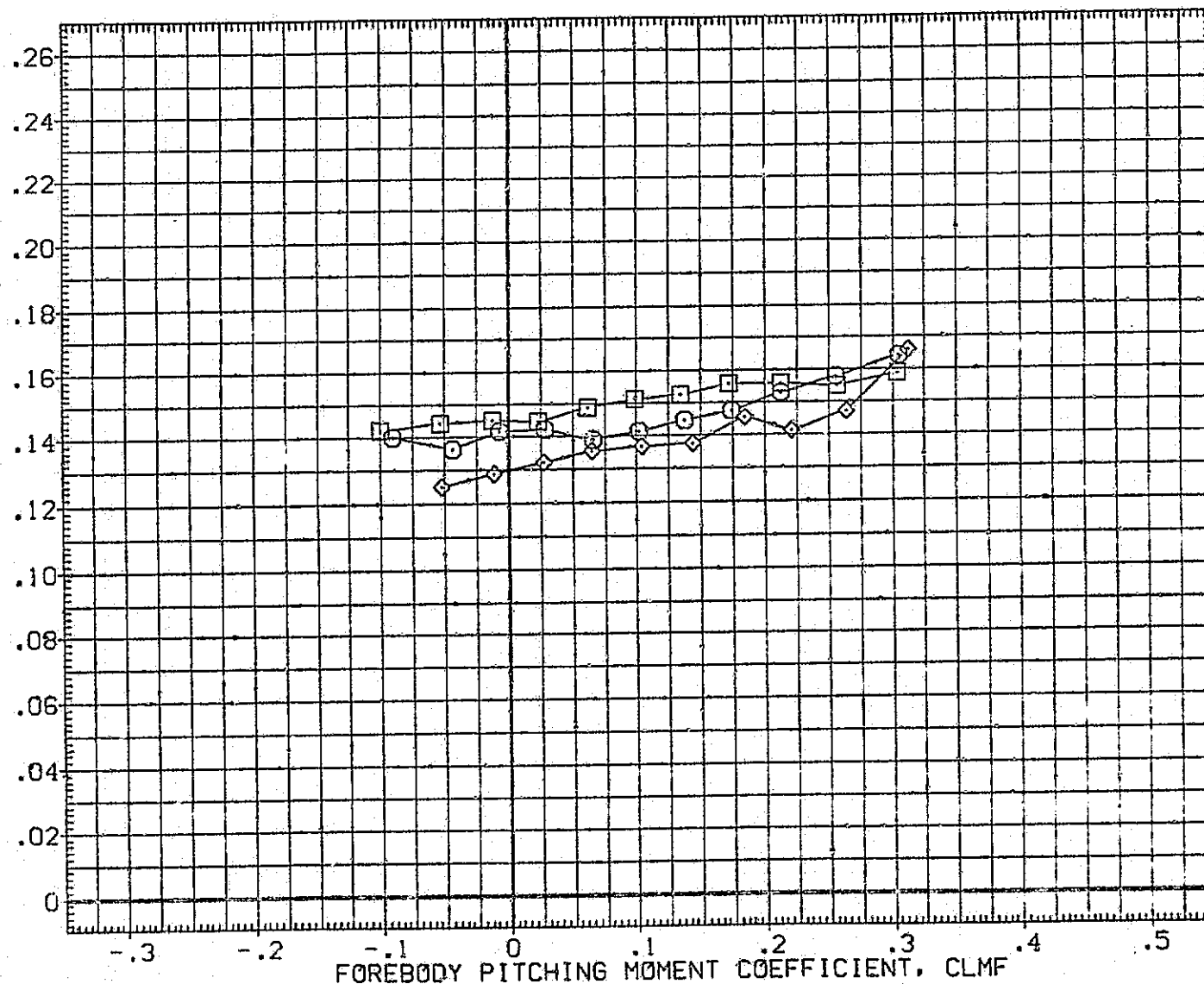


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(A) MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(1A33) 740TS (TIP1SIP201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIP1SIP201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIP1SIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0900	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

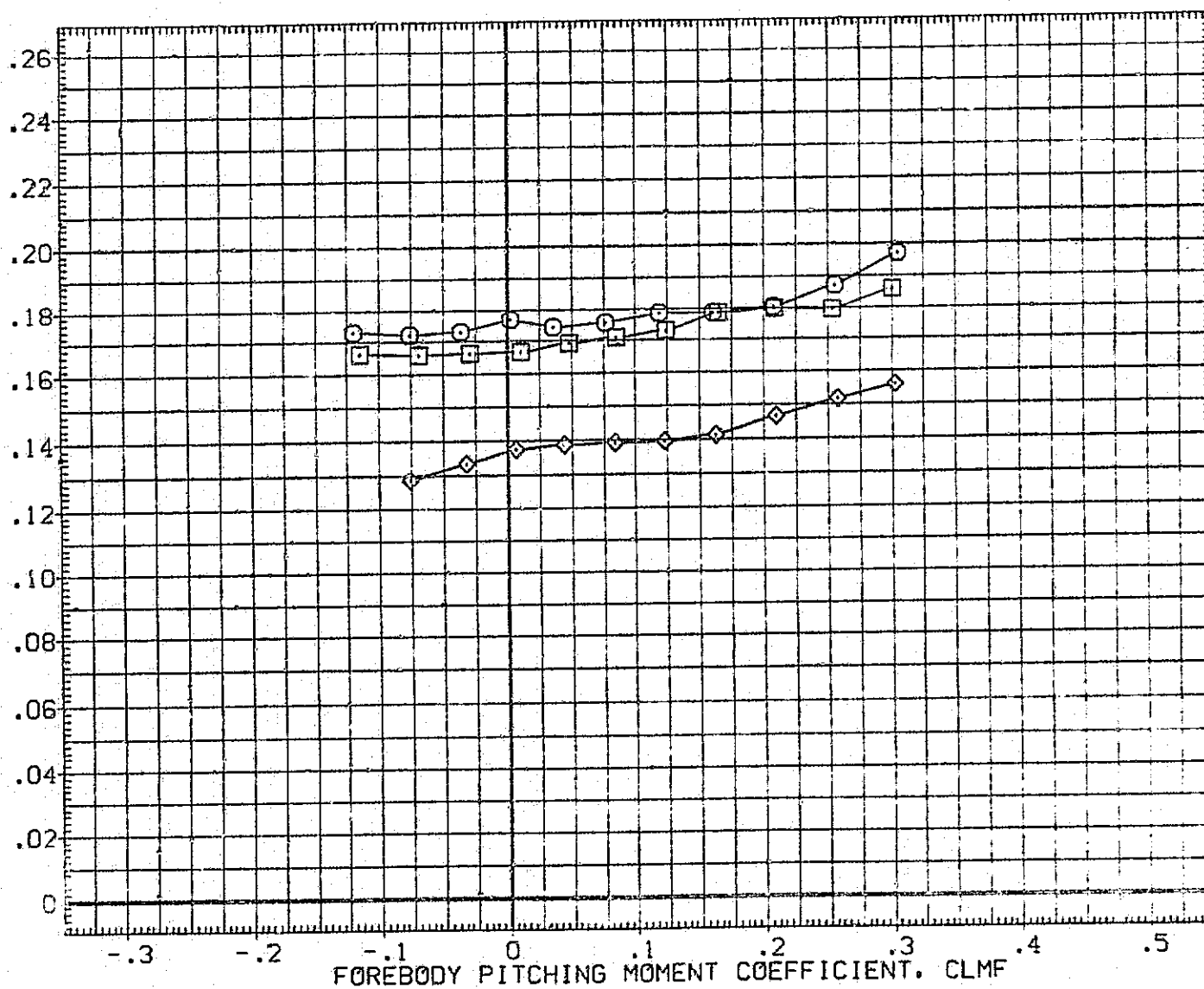


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	290.0000	IN.
BREF	1290.0000	IN.
AMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

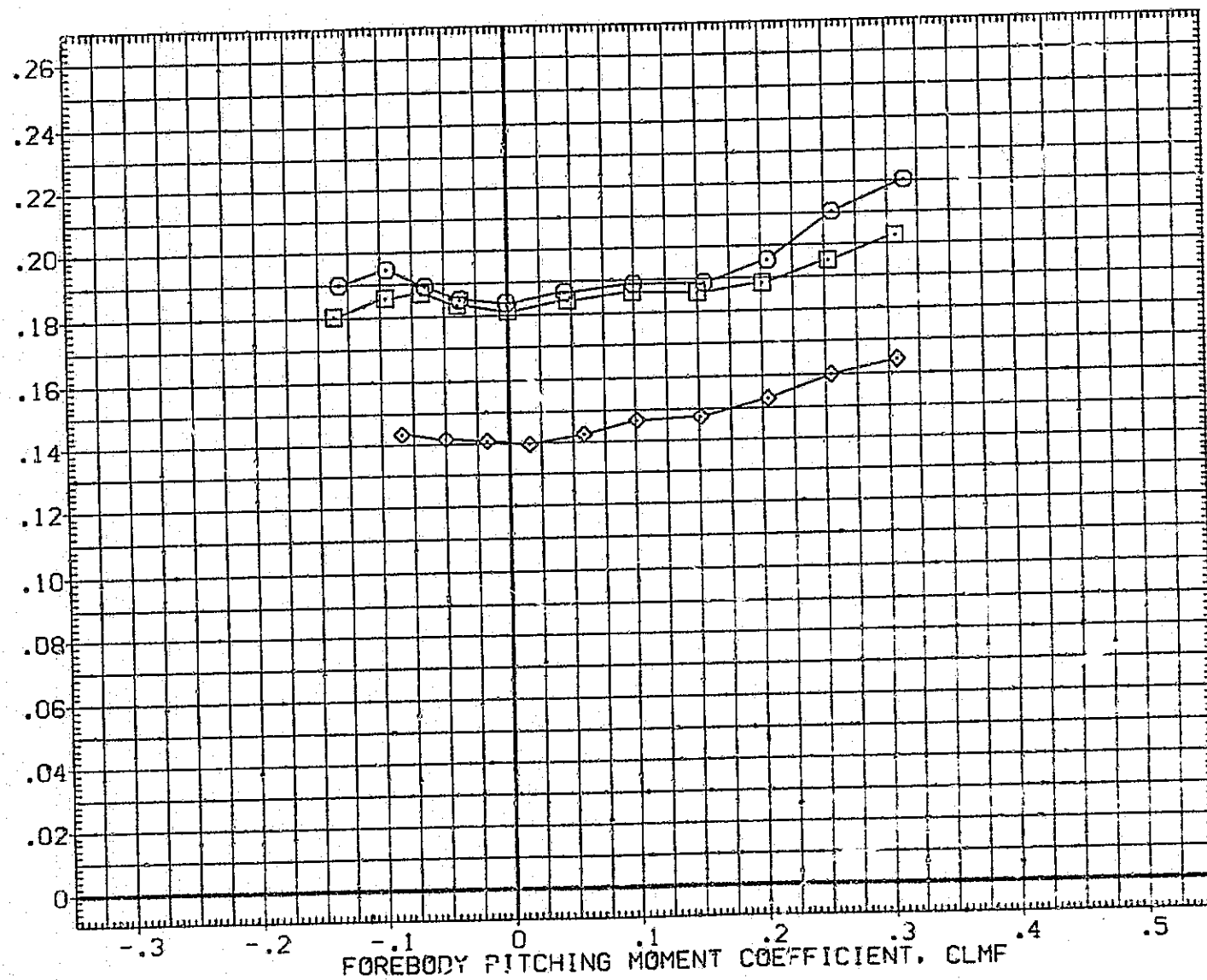


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) ○	MSFC 594(1A33) 740TS (TIP)SIP201 ORB STING
(VIC017) □	MSFC 594(1A33) 740TS (TIP)SIP201 FORKED STING
(VIC019) ◇	MSFC 594(1A33) 740TS (TIP)SIP201 FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SP. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

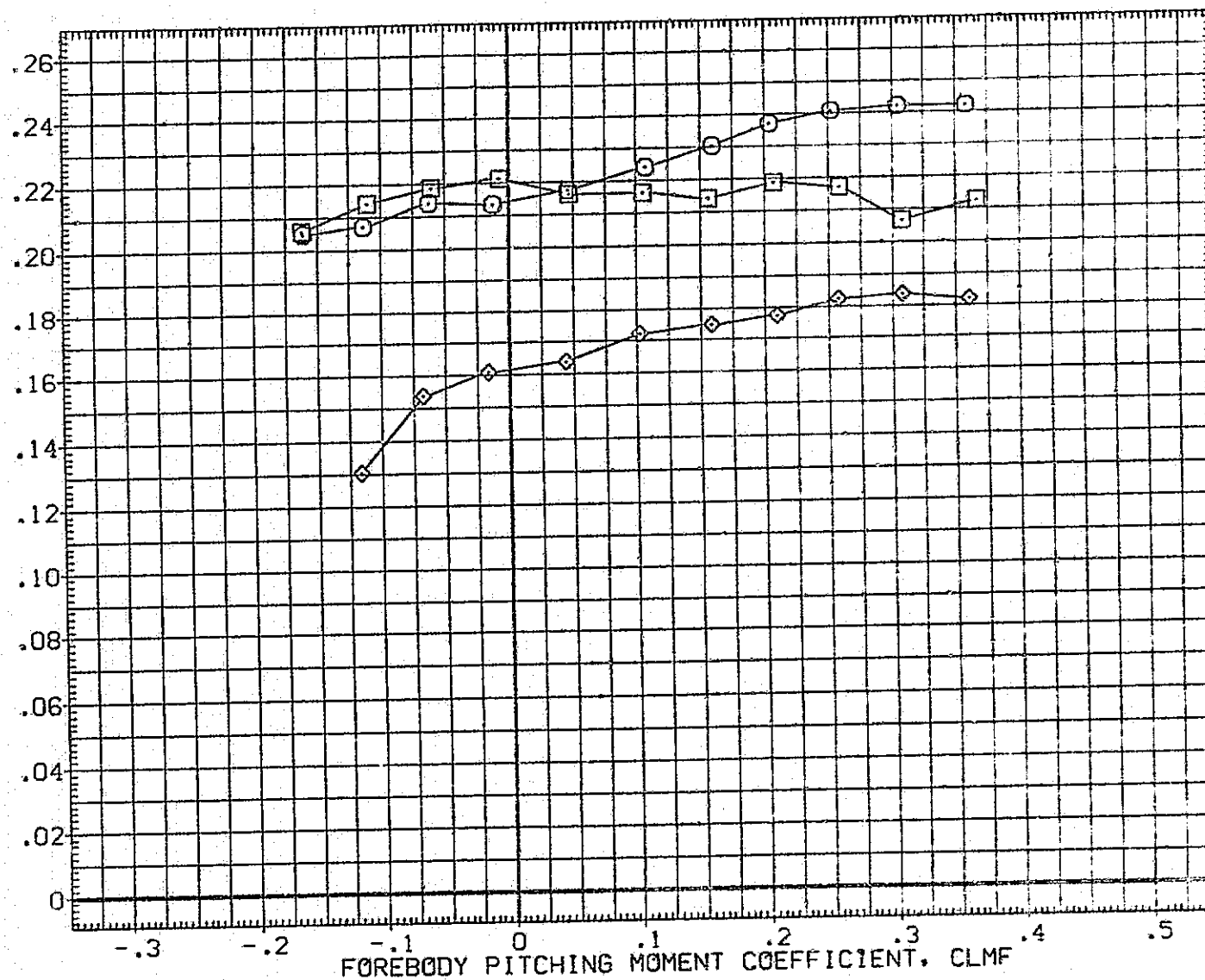


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(CD)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201)	FORNED STING
(VIC019)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

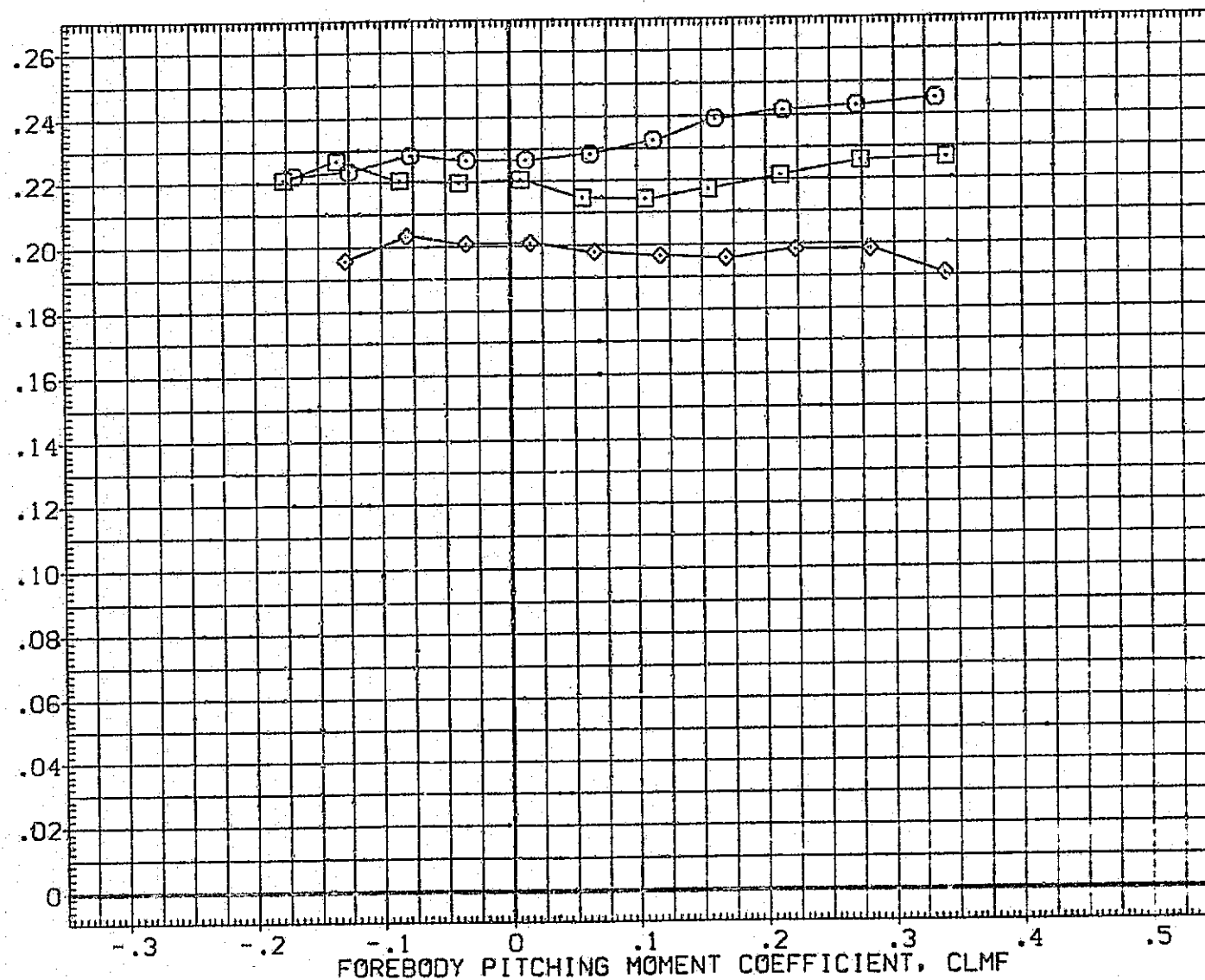


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(E)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) ○	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC017) □	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC019) ◇	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
CREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

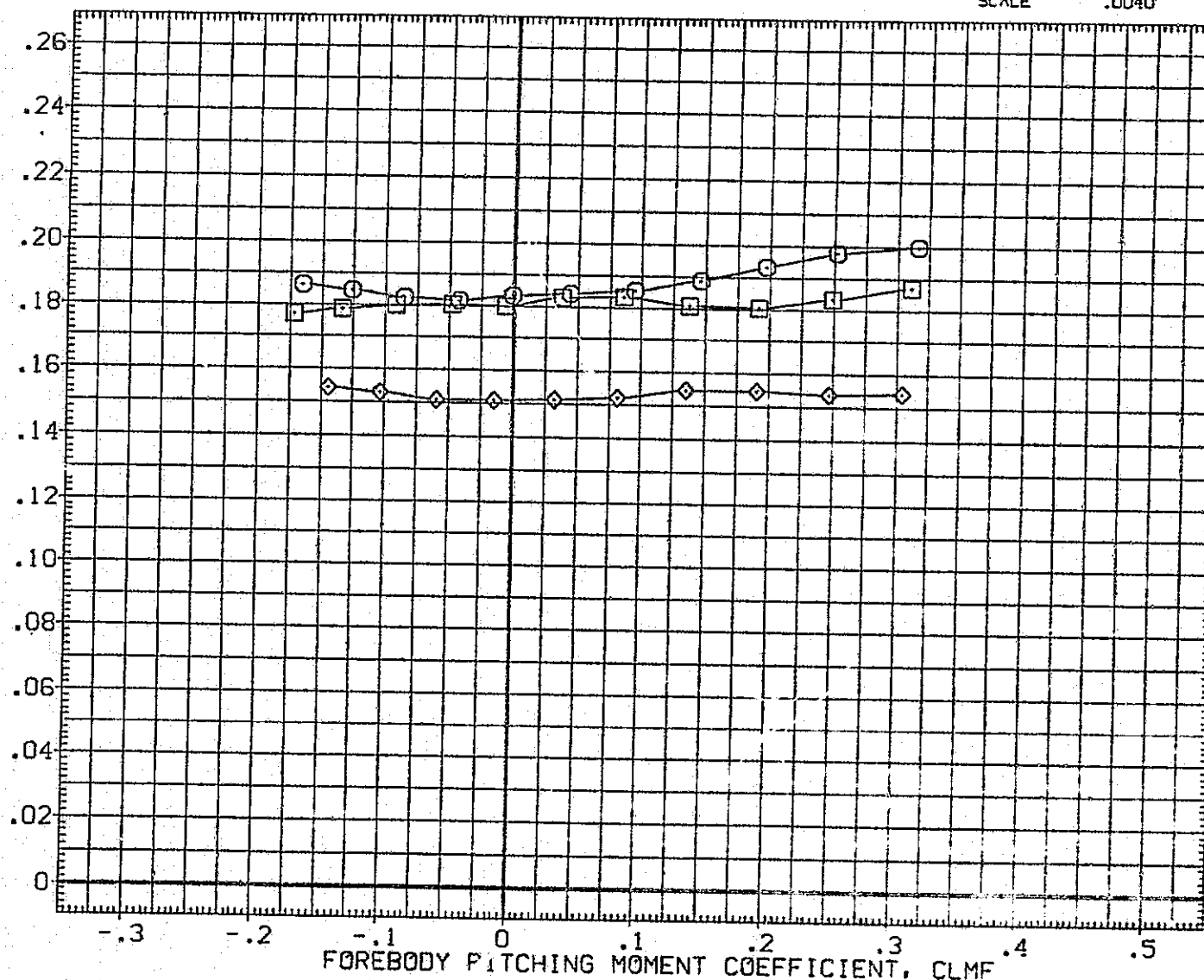


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(F)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) ○	MSFC 594(1A33) 740TS (1:FISIP201) ORB STING
(VIC017) □	MSFC 594(1A33) 740TS (1:FISIP201) FORKED STING
(VIC019) ◇	MSFC 594(1A33) 740TS (1:FISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

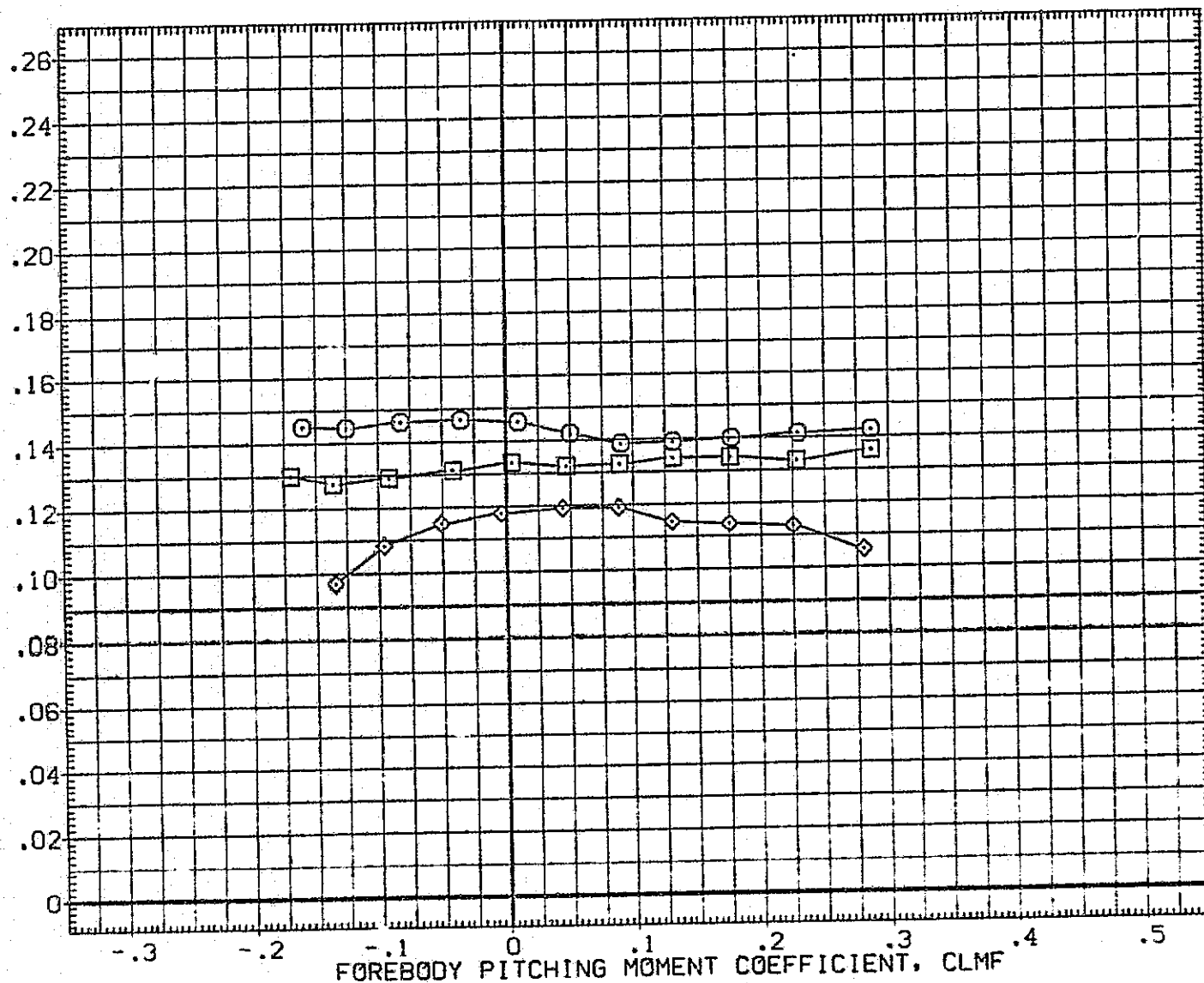


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(G)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) □	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC017) □	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC019) ◇	DATA NOT AVAILABLE

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

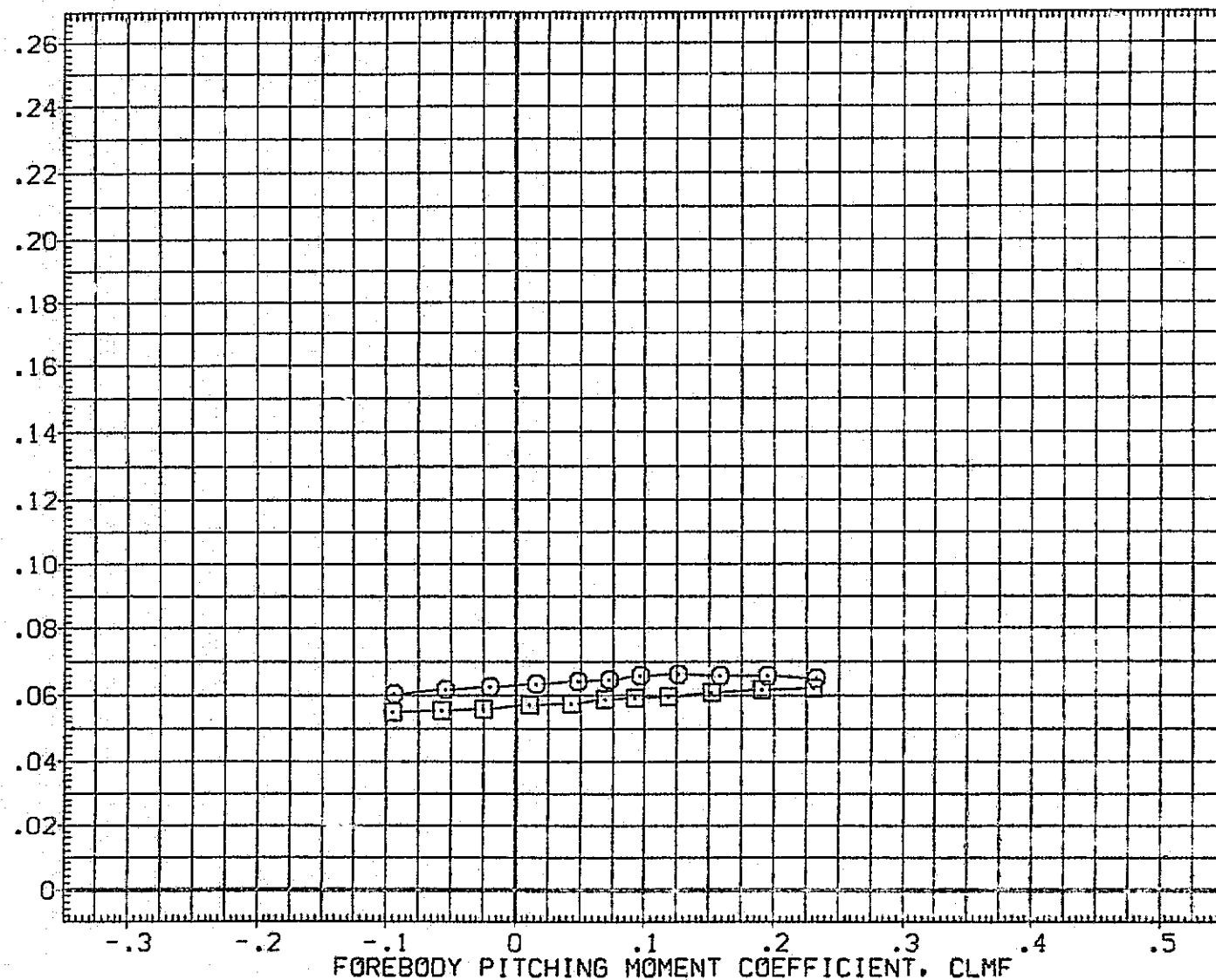


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(H)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (T1P1S1P201)	FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (T1P1S1P201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XHRP	976.0000	IN. XT
YHRP	.0000	IN. YT
ZHRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

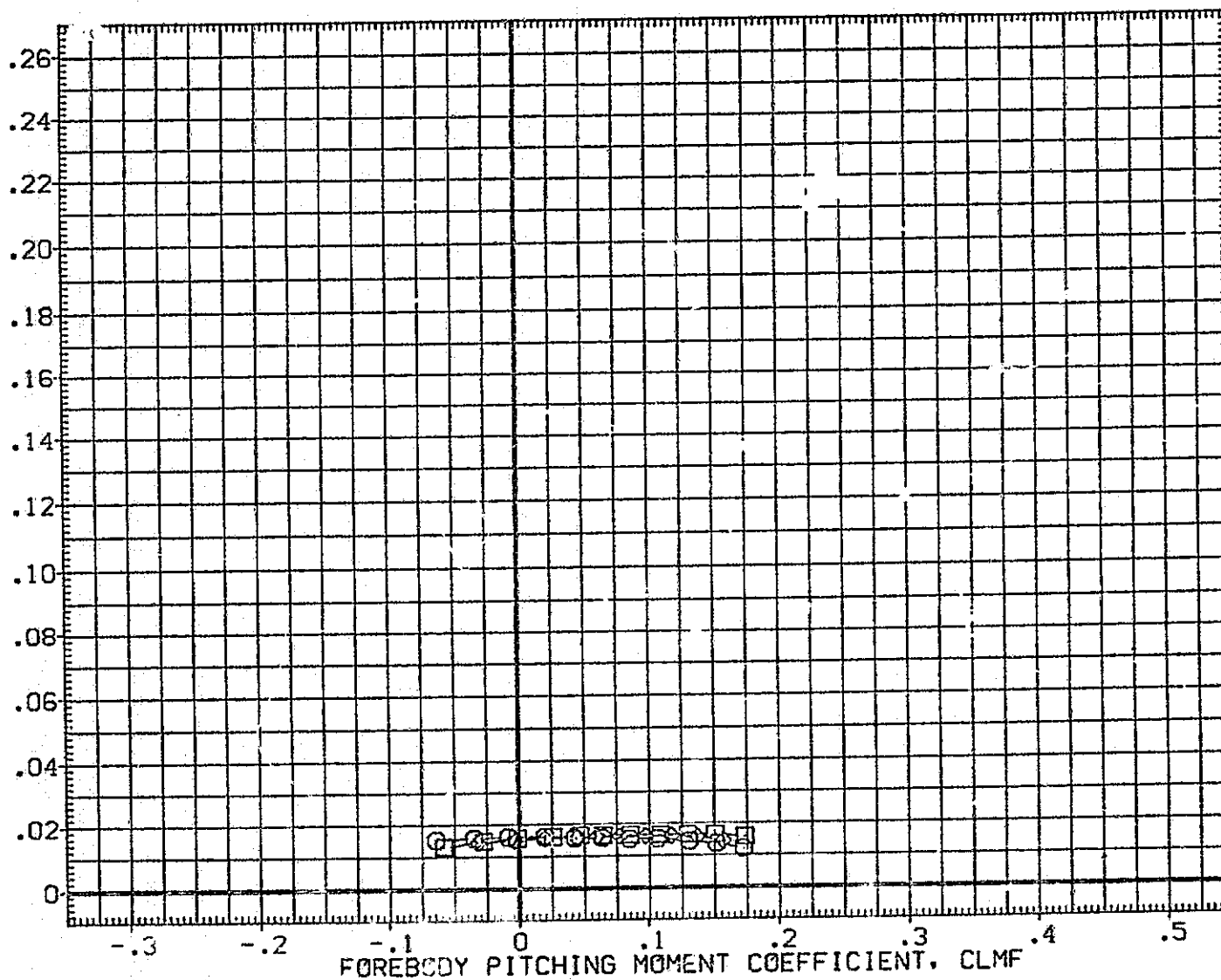


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(1)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIP1SIP201)	FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIP1SIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

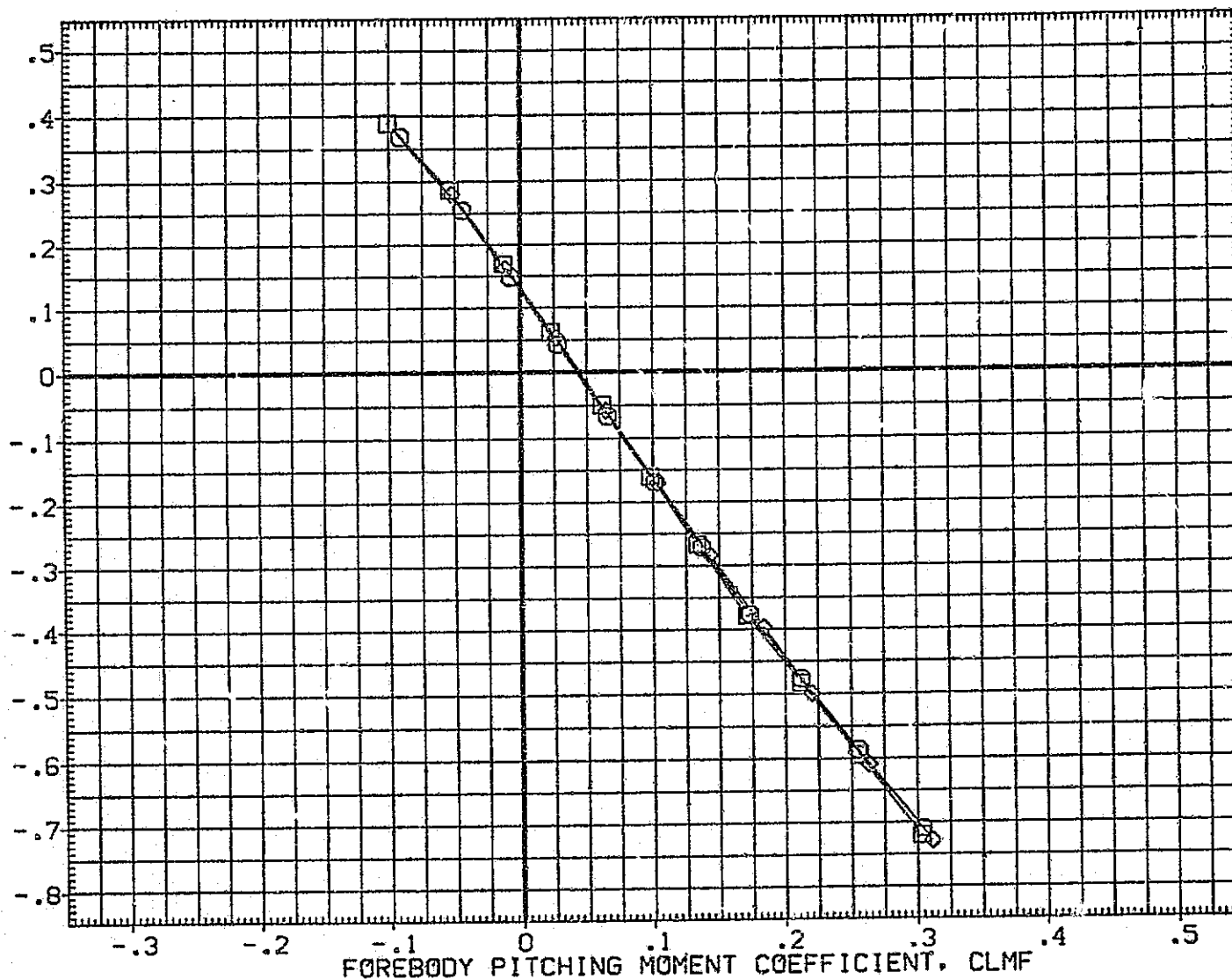


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(A) MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

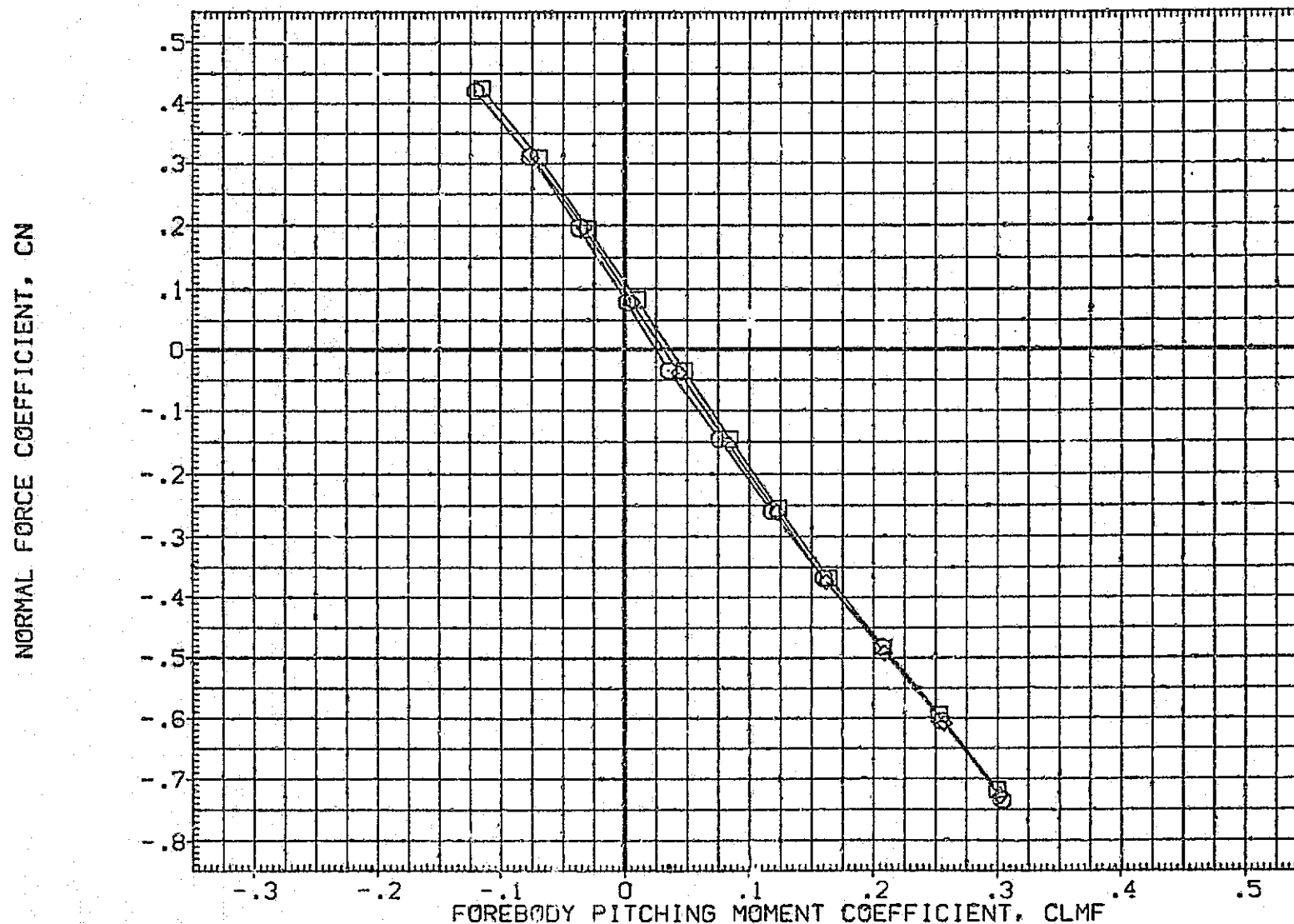


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC S94(1A33) 740TS (T1P1S1P201) ORB STING
(VIC017)	MSFC S94(1A33) 740TS (T1P1S1P201) FORKED STING
(VIC019)	MSFC S94(1A33) 740TS (T1P1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SD. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

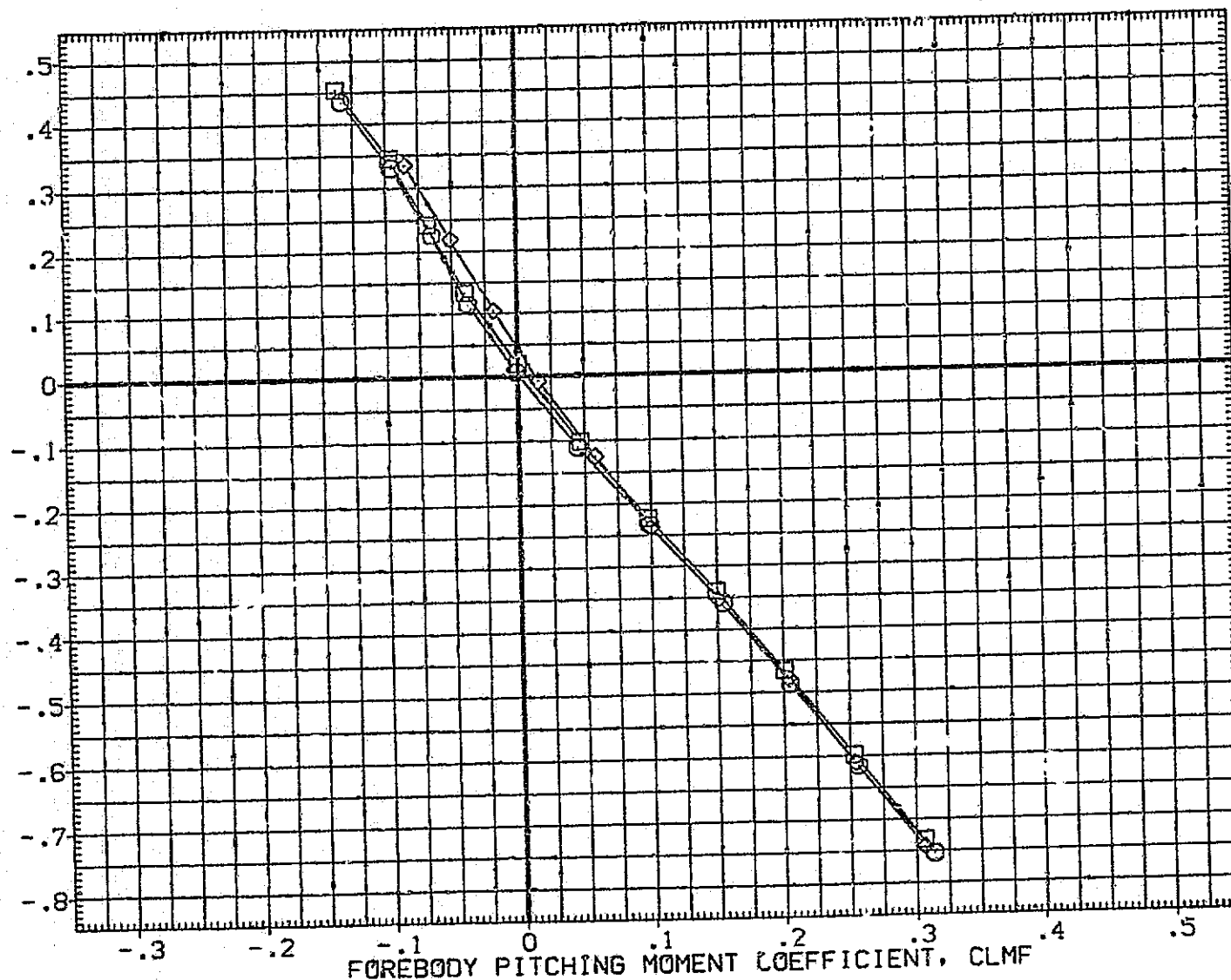


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
[VIC007] ○	MSFC 594(A33) 740TS (TIP1SIP201) ORB STING
[VIC017] ◇	MSFC 594(A33) 740TS (TIP1SIP201) FORKED STING
[VIC019] ◇	MSFC 594(A33) 740TS (TIP1SIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

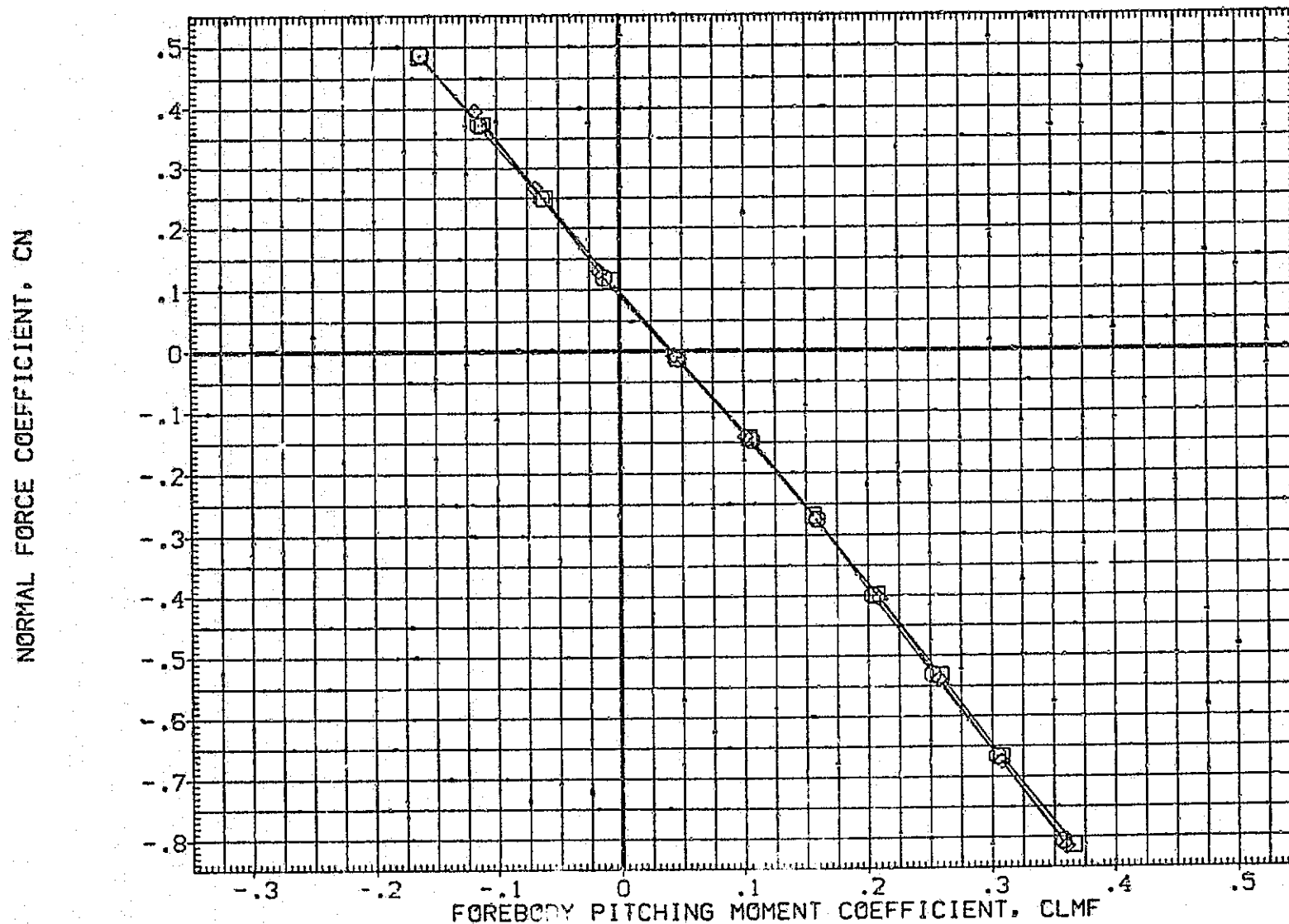


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
 (D)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	576.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

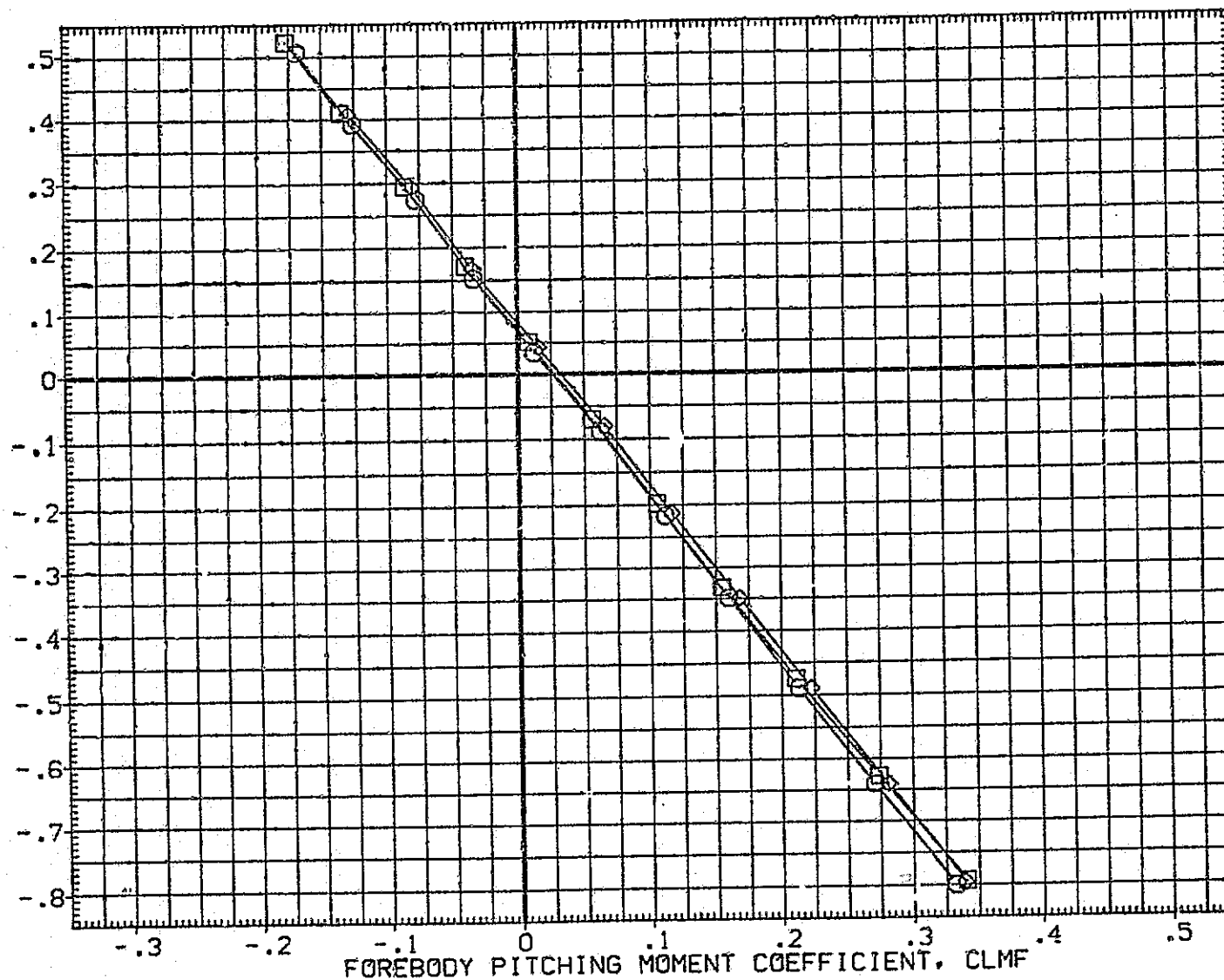


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(E)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC007)	MSFC 594(IA33) 740TS (TIPISIP201)	ORB STING
(VIC017)	MSFC 594(IA33) 740TS (TIPISIP201)	FORKED STING
(VIC019)	MSFC 594(IA33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

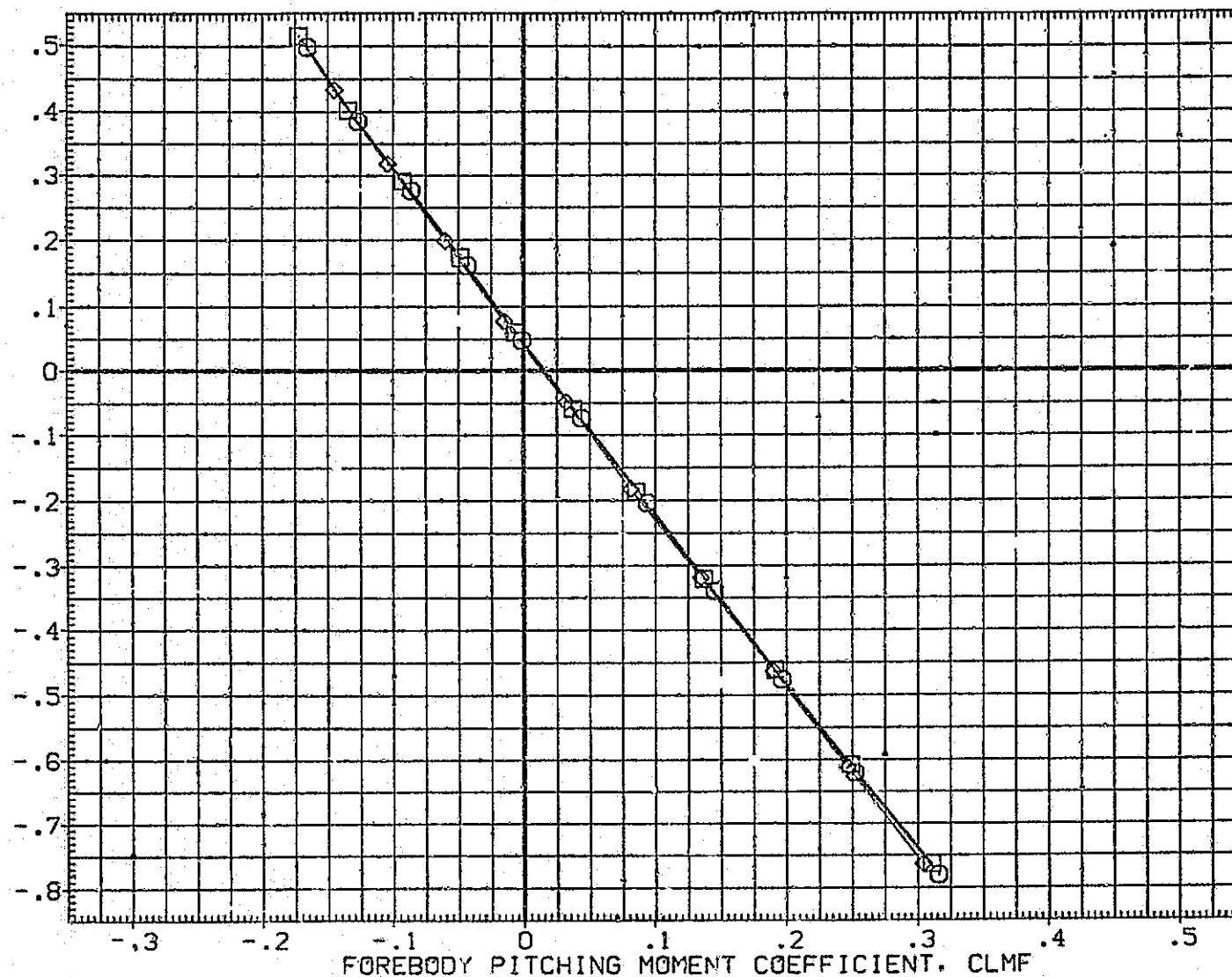


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(F)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(1A33) 740TS (TIP1S1P201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIP1S1P201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIP1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

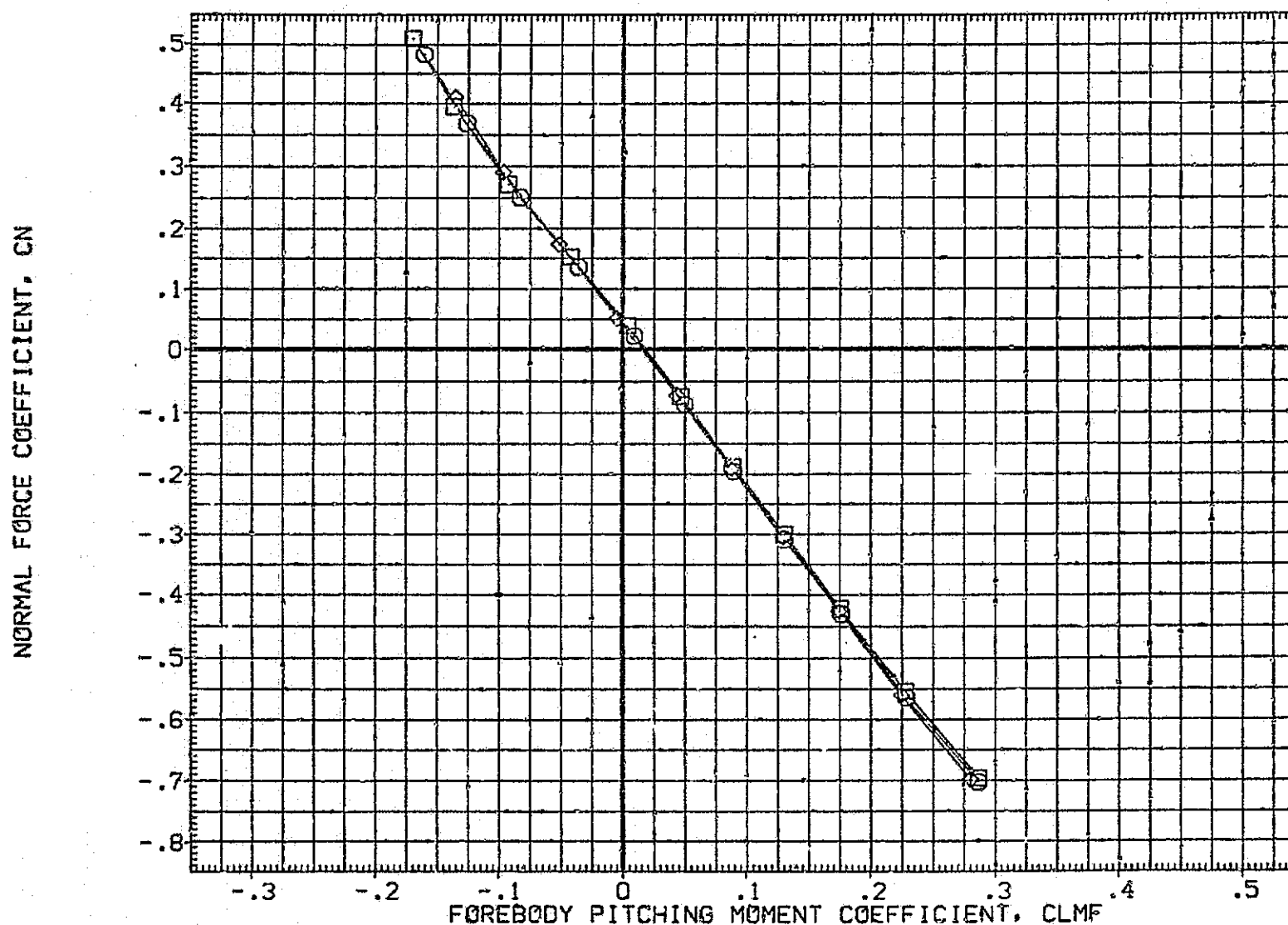


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(G)MACH = 1.96

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING
(VIC019)	DATA NOT AVAILABLE

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

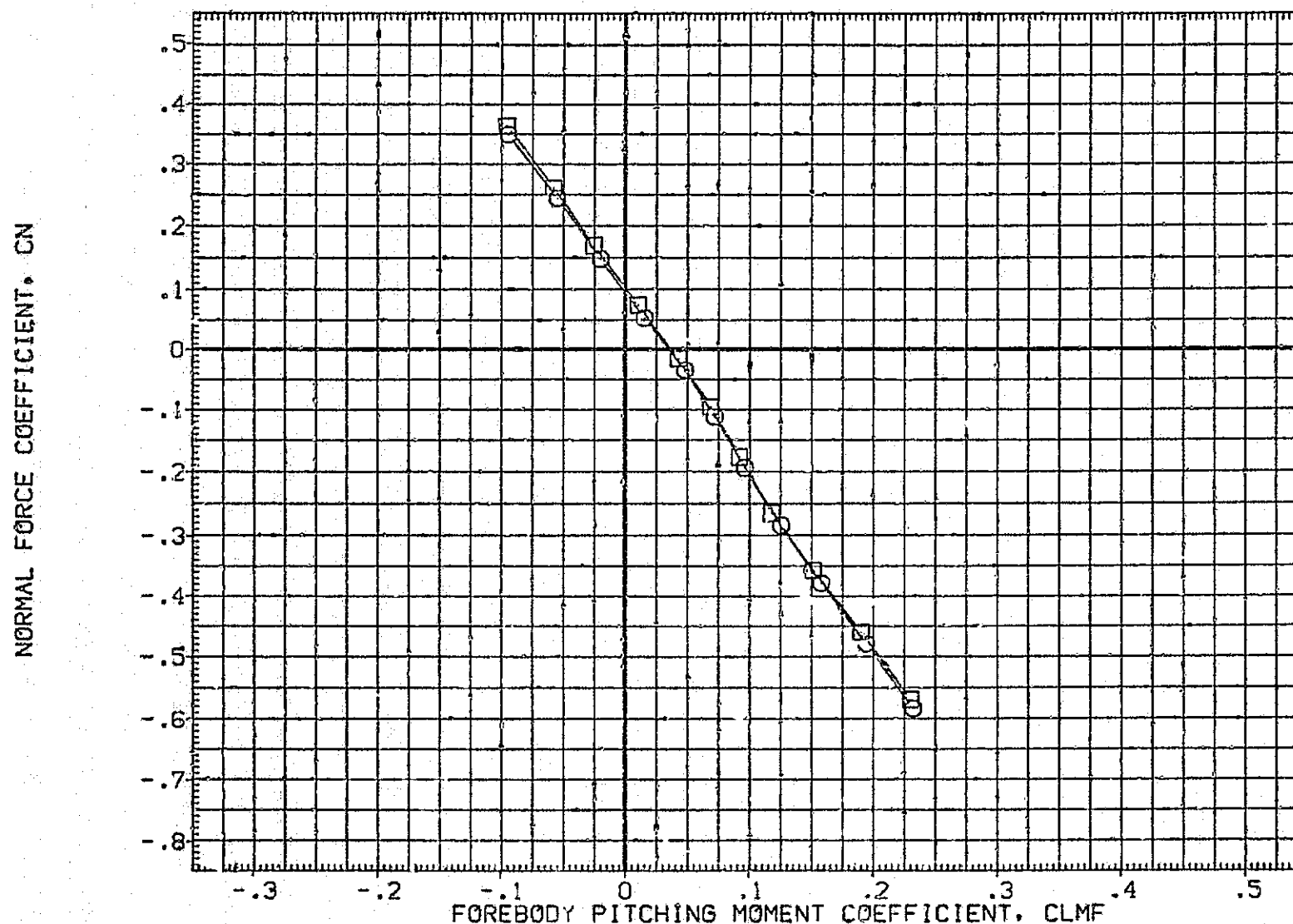


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(H)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
{VIC007}	MSFC 594(1A33) 740TS (TIP1S1P201) ORB STING
{VIC017}	MSFC 594(1A33) 740TS (TIP1S1P201) FORKED STING
{VIC019}	MSFC 594(1A33) 740TS (TIP1S1P201) FORKED STING

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

NORMAL FORCE COEFFICIENT, CN

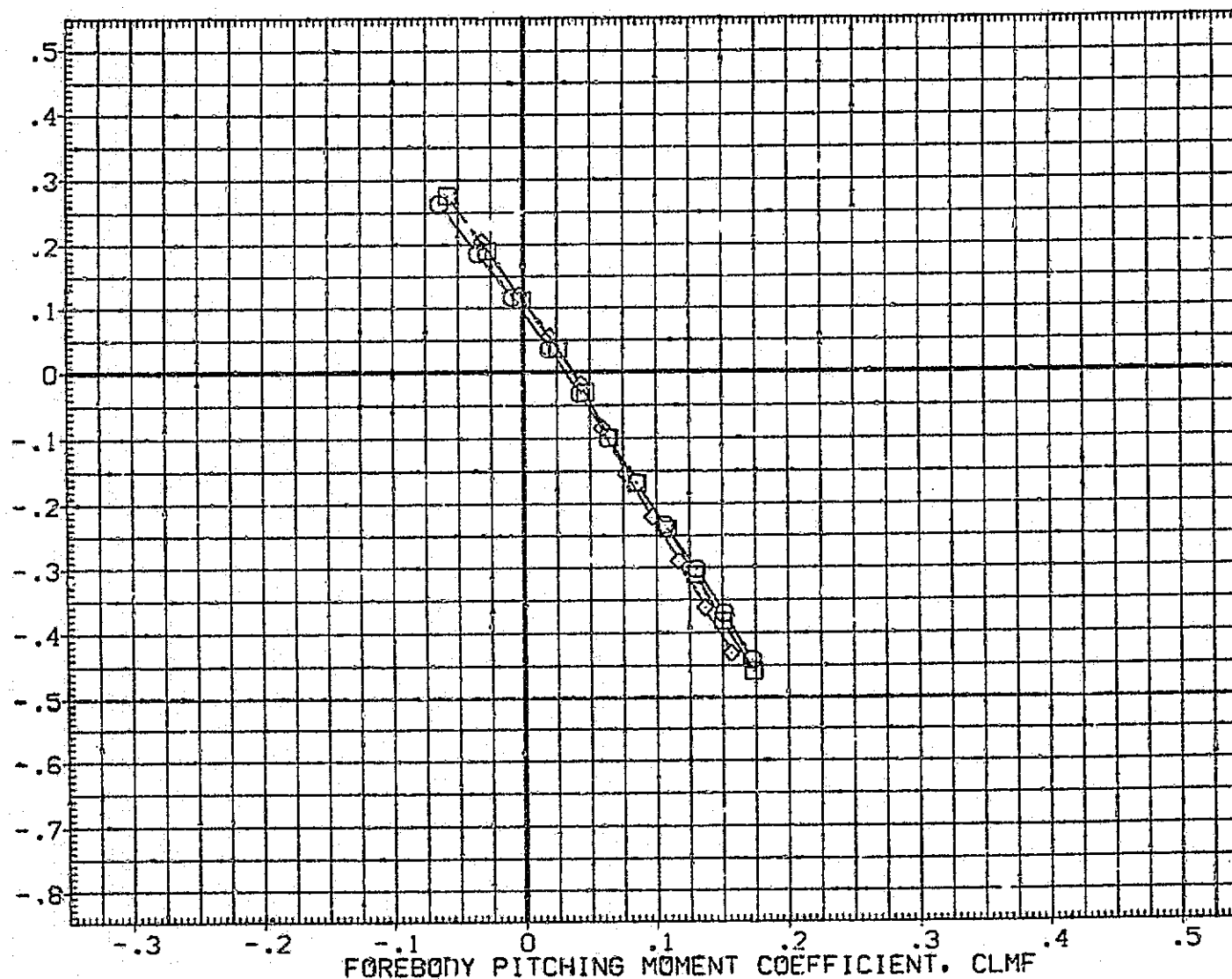


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

CI MACH = 4.96

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(AIC007)	□	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VIC017)	□	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(AIC019)	◇	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

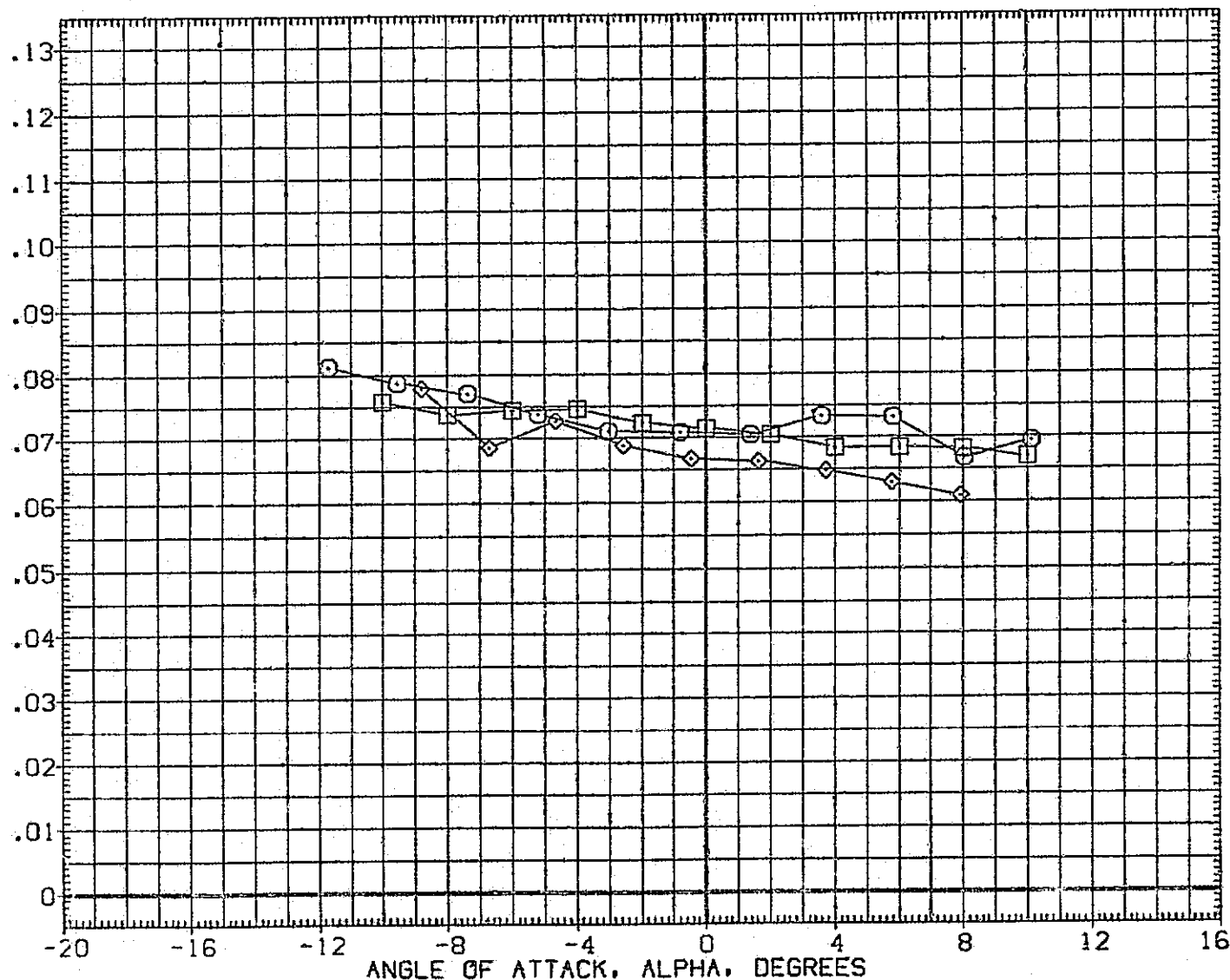





FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C007) 	MSFC 594(A33) 740TS (TIPISIP201) ORB STING
(V1C017) 	MSFC 594(A33) 740TS (TIPISIP201) FORKED STING
(A1C019) 	MSFC 594(A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

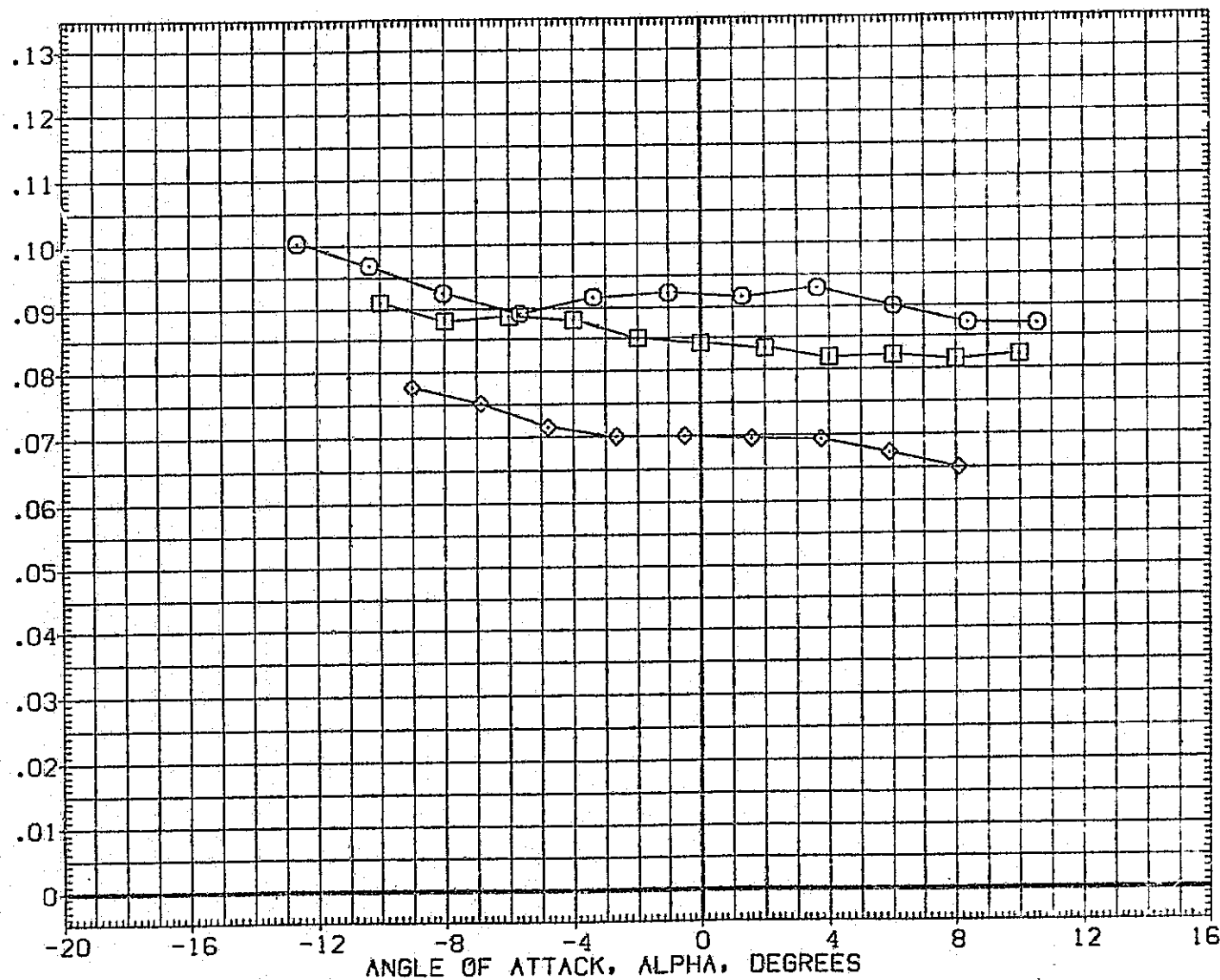


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(AIC019)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION

SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

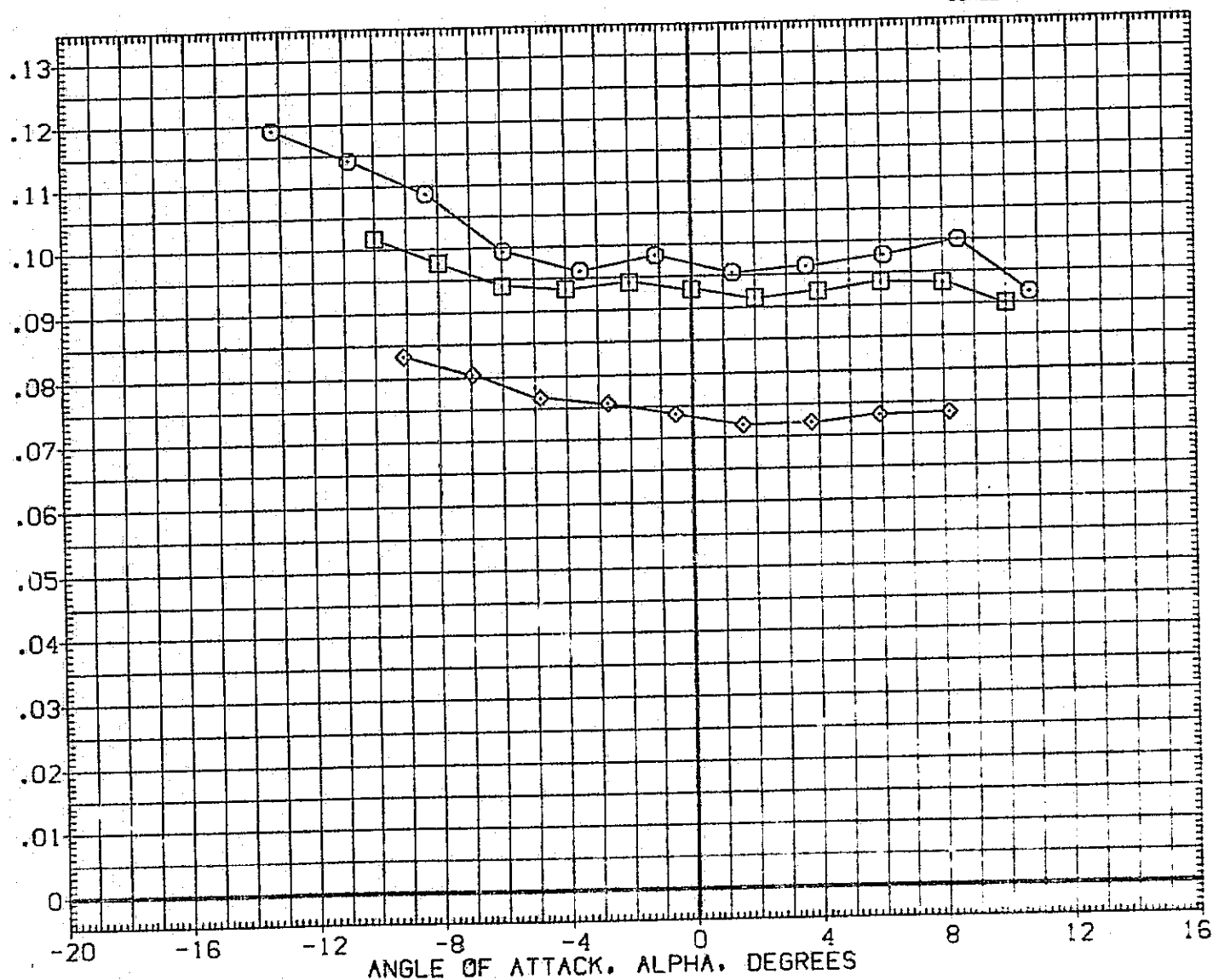


FIG 2 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(C)MACH = .91

DATA SET SYMBOL CONFIGURATION DESCRIPTION 278 STING
 (AIC007) ○ MSFC 594(1A33) 740TS (TIP1SIP201)
 (VICO17) ◇ DATA NOT AVAILABLE
 (AIC019) ◇ DATA NOT AVAILABLE

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

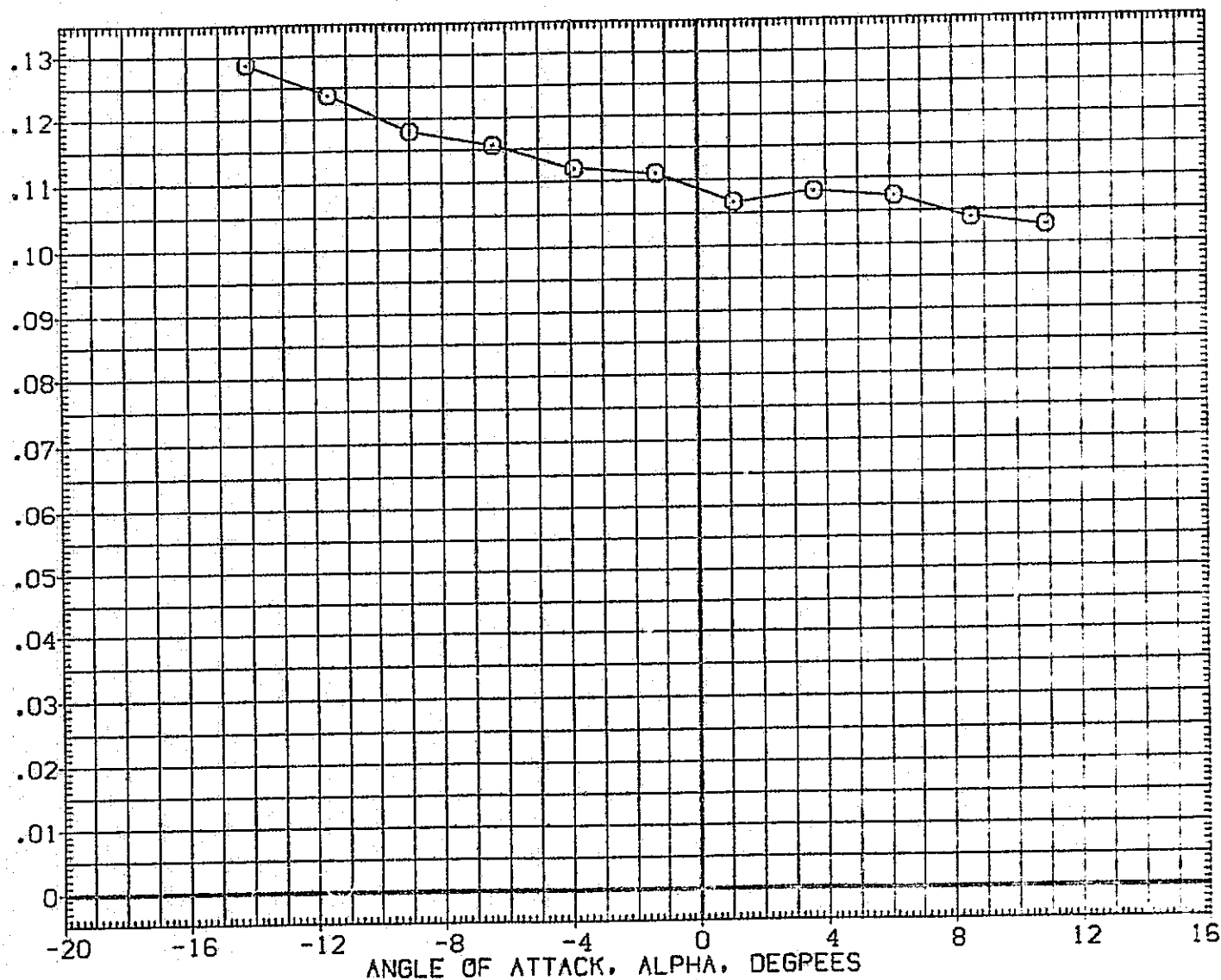


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
 (D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC007)	MSFC 594(IA33) 740TS (TIPISIP201) ORB STING
(VIC017)	MSFC 594(IA33) 740TS (TIPISIP201) FORKED STING
(AIC019)	MSFC 594(IA33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

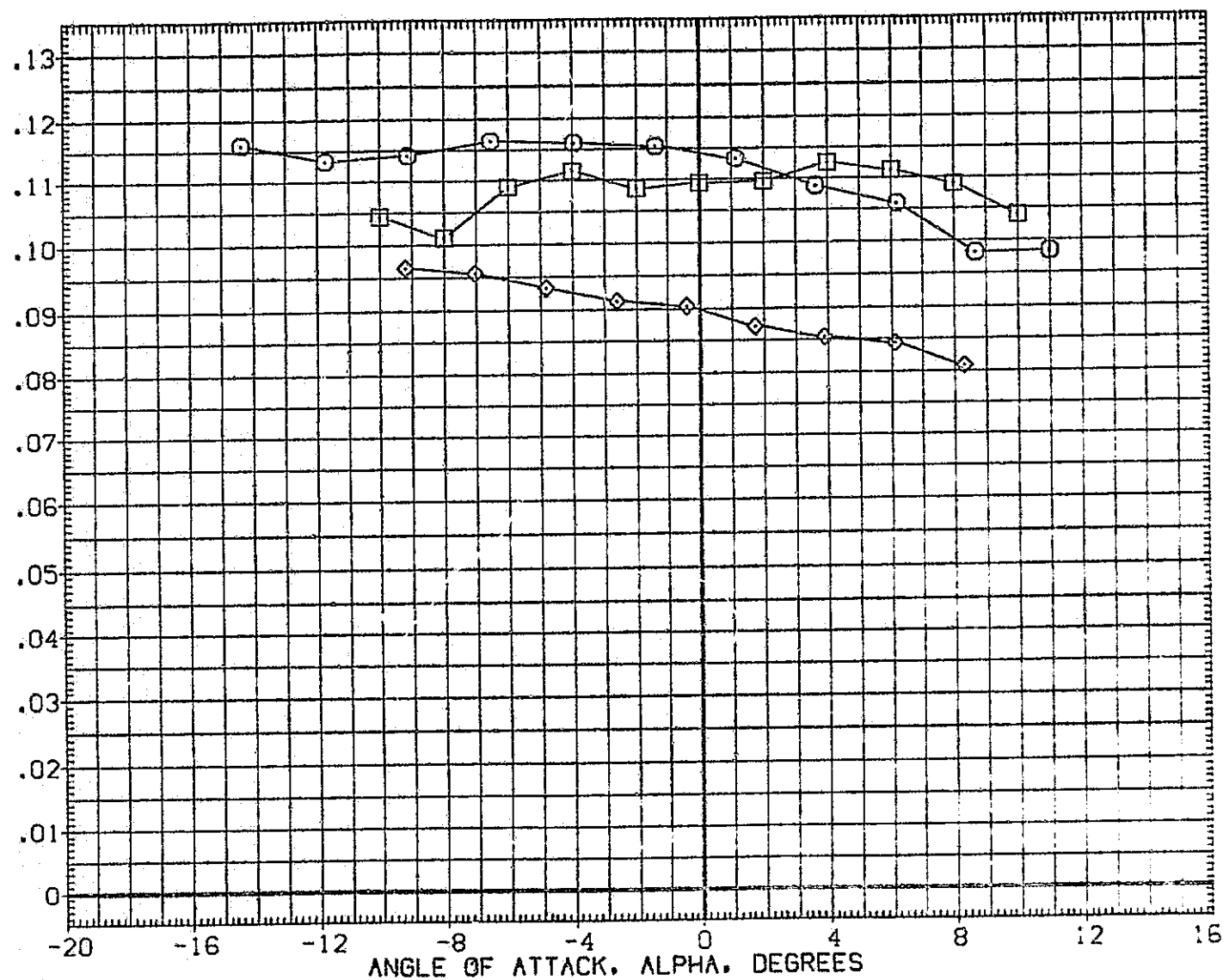


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIG STING
(A1C007)	MSFC S94(1A33) 740TS (T1P1S1P201)	ORB STING
(V1C017)	MSFC S94(1A33) 740TS (T1P1S1P201)	FORKED STING
(A1C019)	MSFC S94(1A33) 740TS (T1P1S1P201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

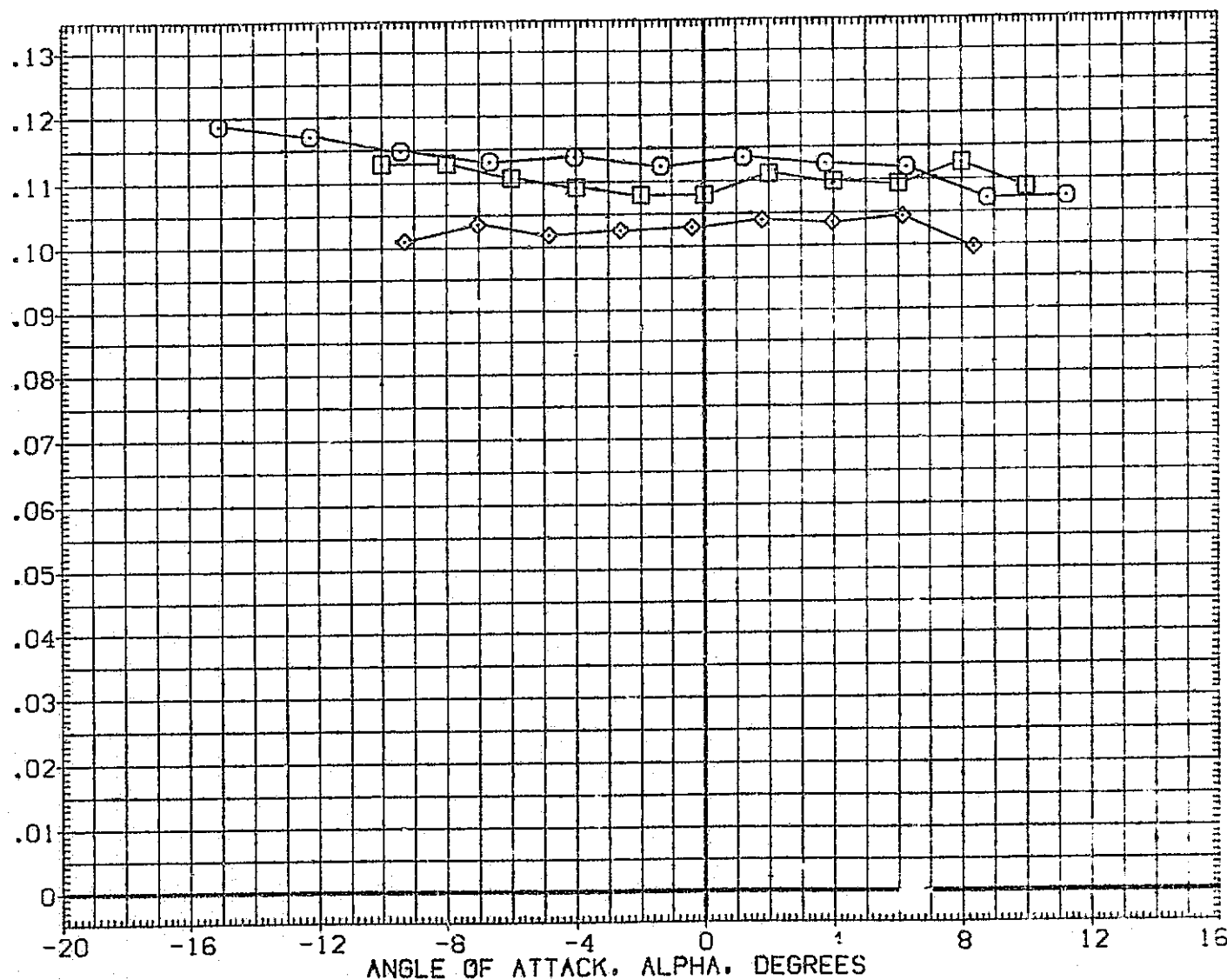


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(F)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC007)	MSFC 594(1A33) 740TS (TIP1SIP201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIP1SIP201) FORKED STING
(AIC019)	MSFC 594(1A33) 740TS (TIP1SIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

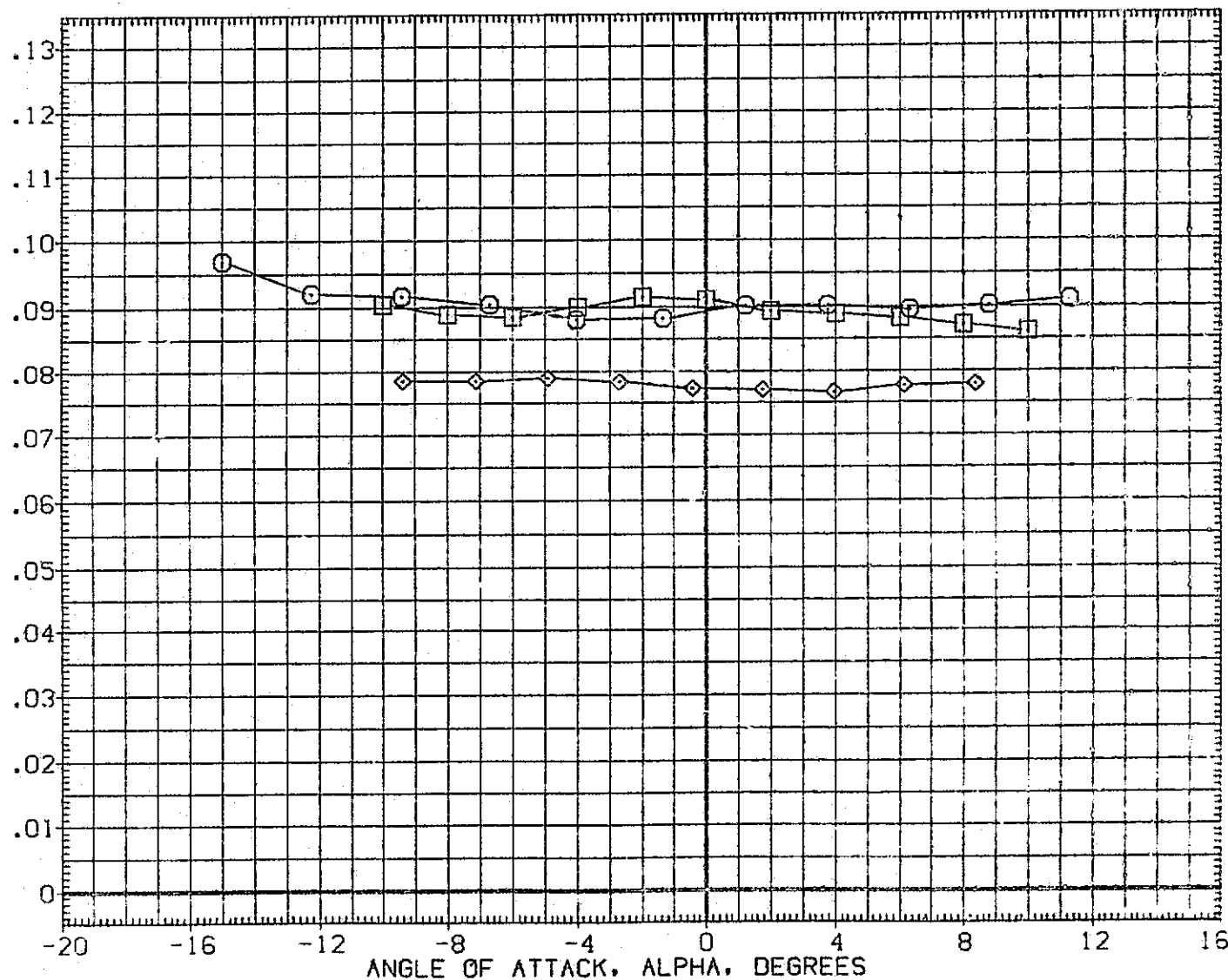


FIG 2 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(G)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (TIP)SIP201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIP)SIP201)	FORKED STING
(AIC019)	MSFC 594(1A33) 740TS (TIP)SIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

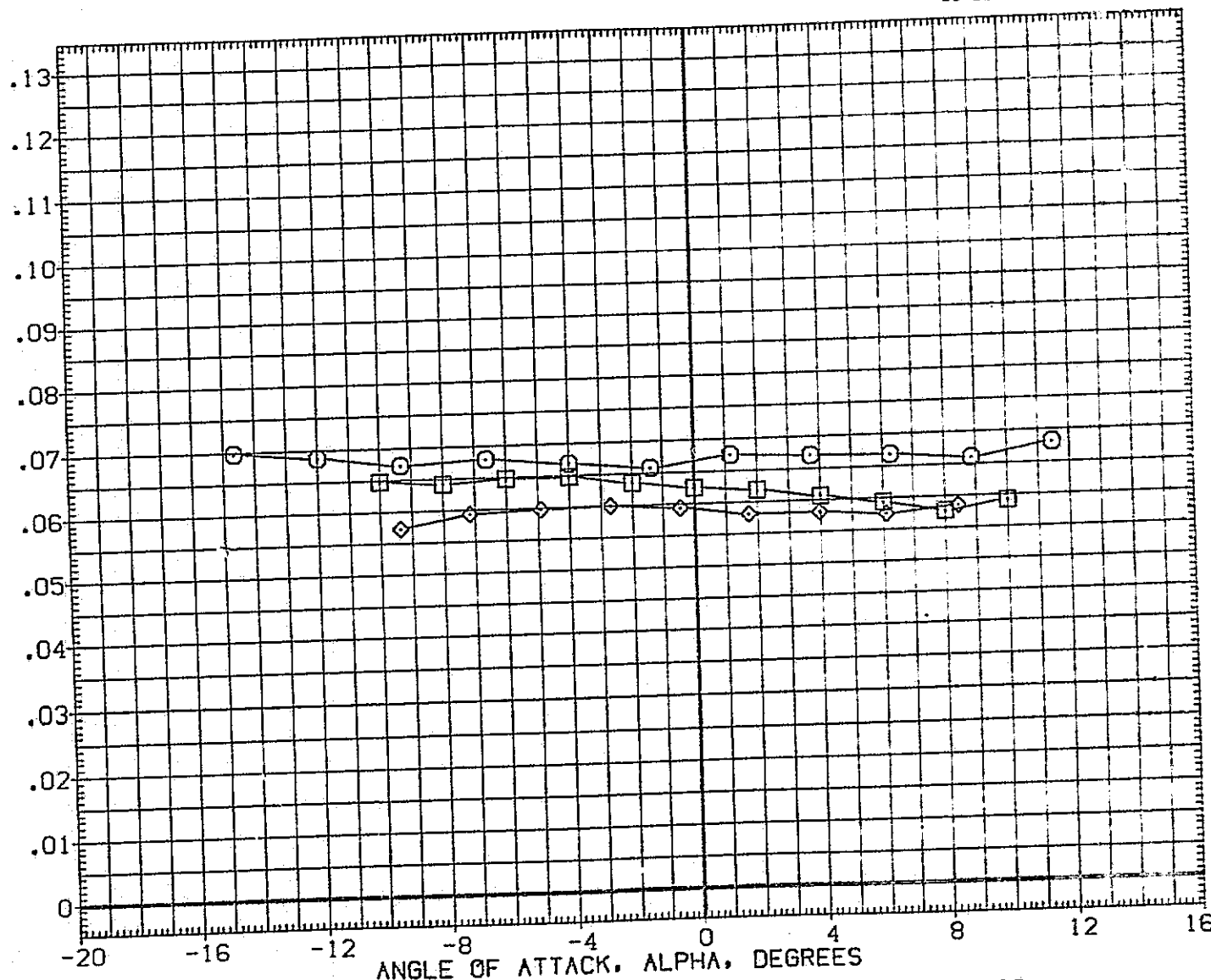


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(H)MACH = 1.97

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORBIT STING
{AIC007}	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
{VIC017}	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
{AIC019}	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

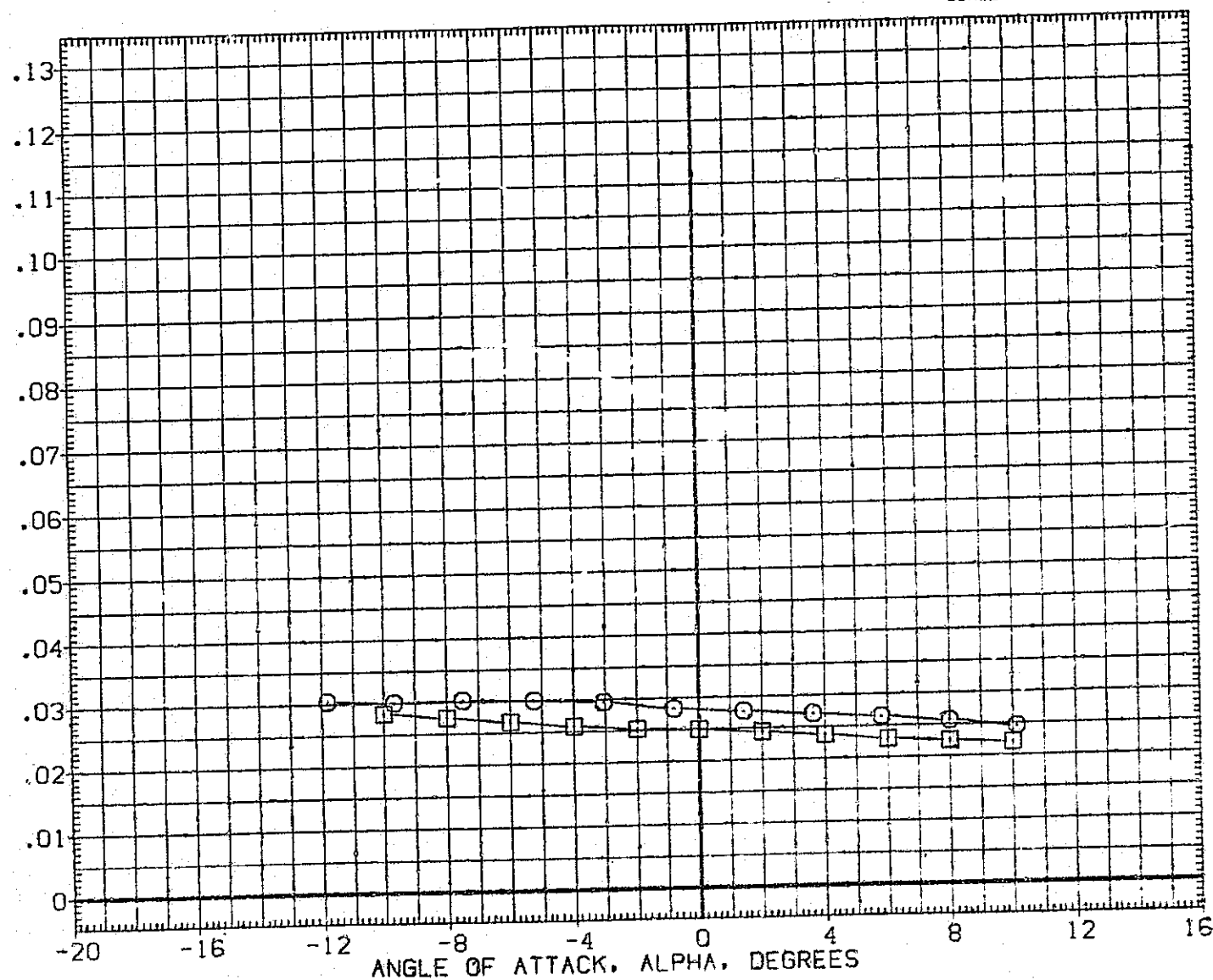


FIG 3 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(1)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VICO17)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(AIC019)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

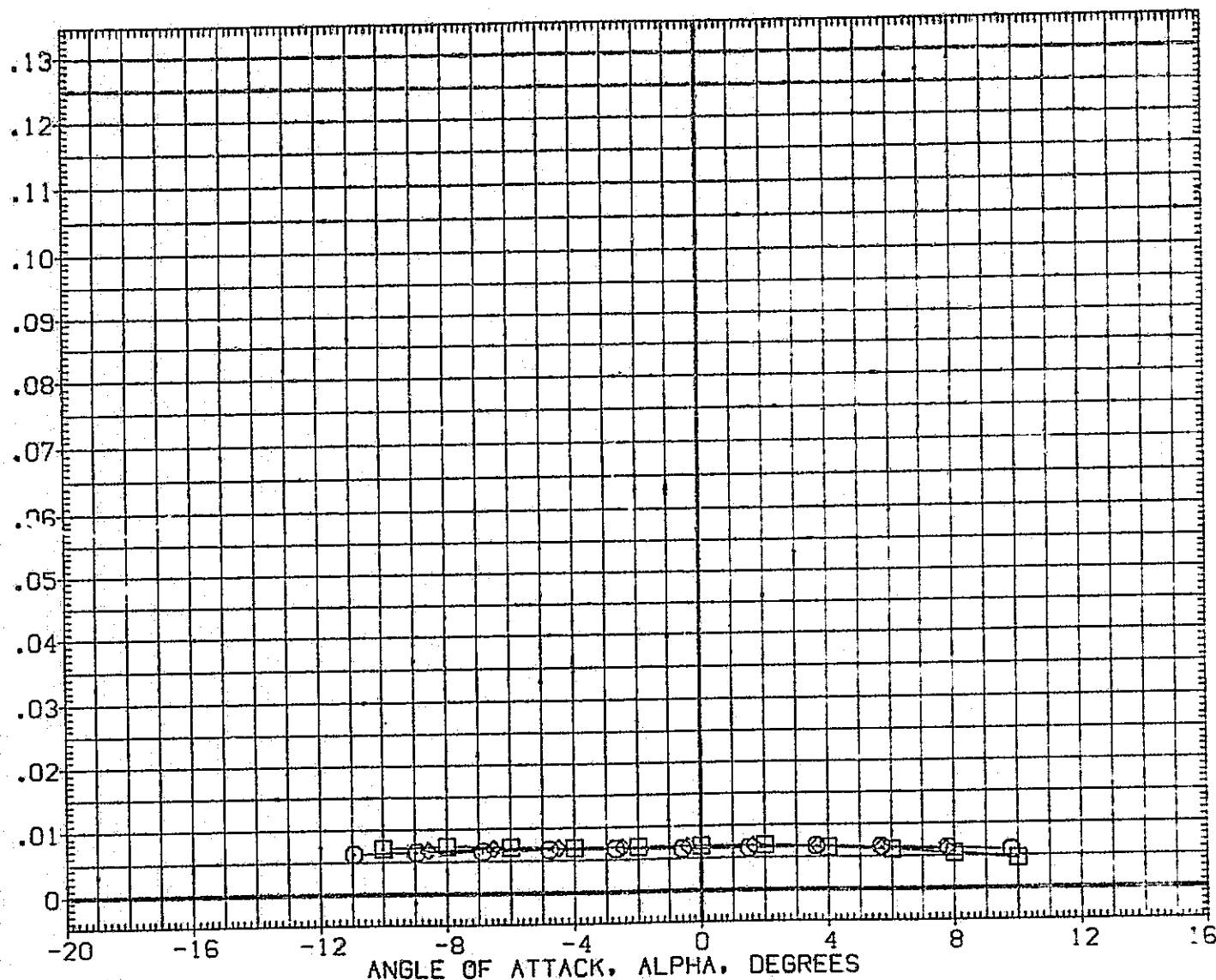


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC007) ○	MSFC 594(IA33) 740TS (TIPISIP201) ORB STING
(VIC017) □	MSFC 594(IA33) 740TS (TIPISIP201) FORKED STING
(AIC019) ◇	MSFC 594(IA33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

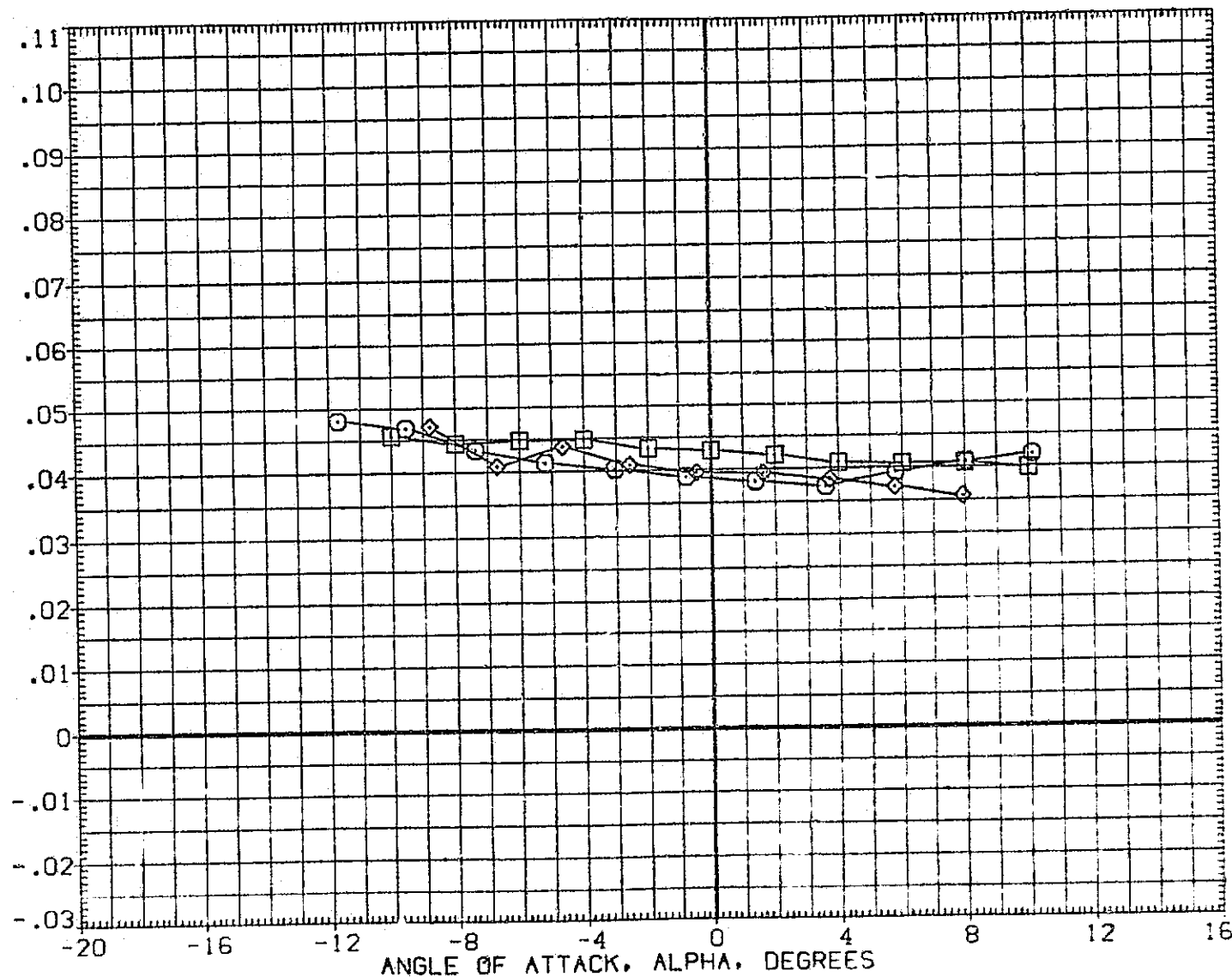


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC S94(1A33) 740TS (TIP)SIP201)	ORB STING
(VIC017)	MSFC S94(1A33) 740TS (TIP)SIP201)	FORKED STING
(AIC019)	MSFC S94(1A33) 740TS (TIP)SIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

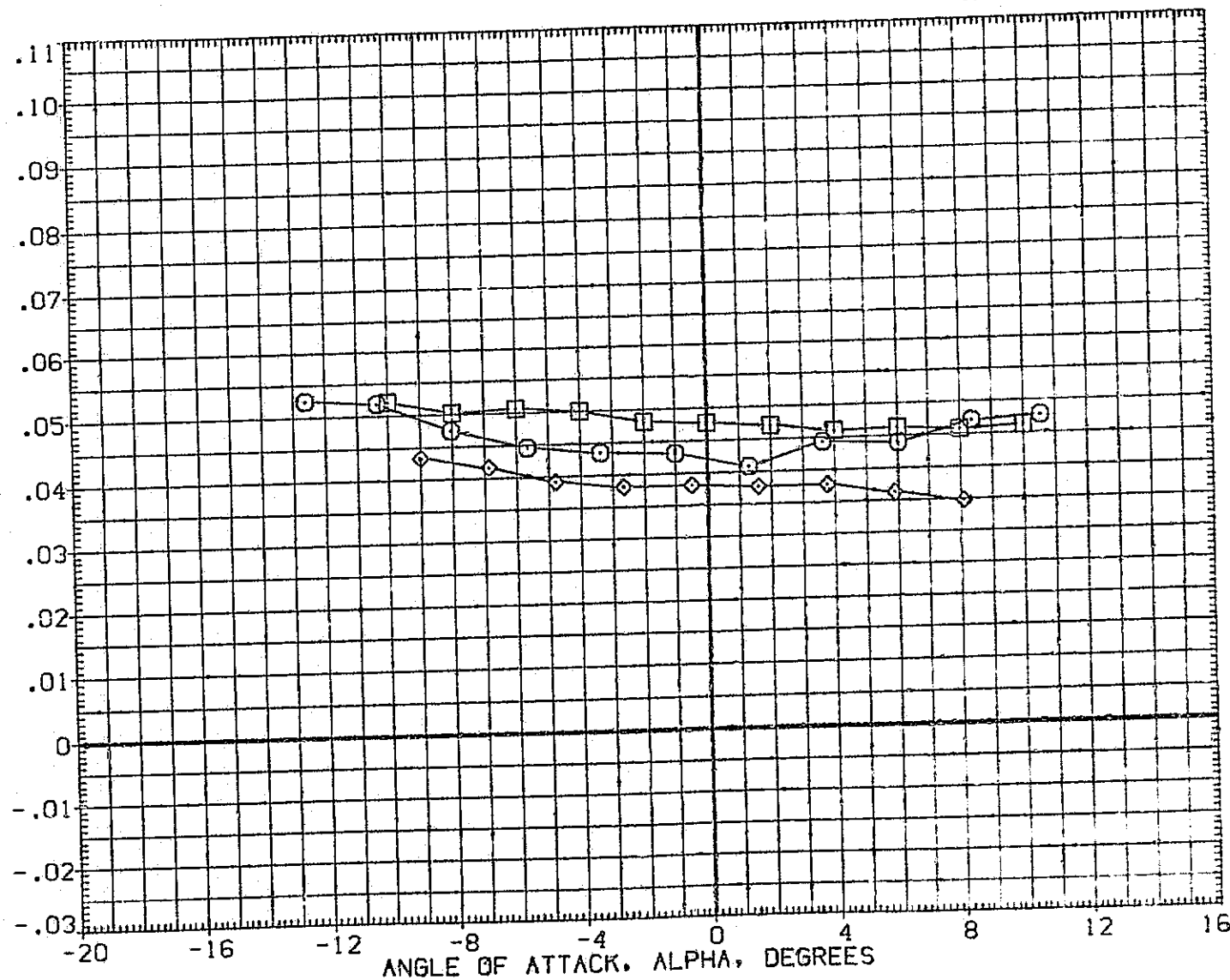


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (T1PIS1P201)	ORB STING
(VICO17)	MSFC 594(1A33) 740TS (T1PIS1P201)	FORKED STING
(AIC019)	MSFC 594(1A33) 740TS (T1PIS1P201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

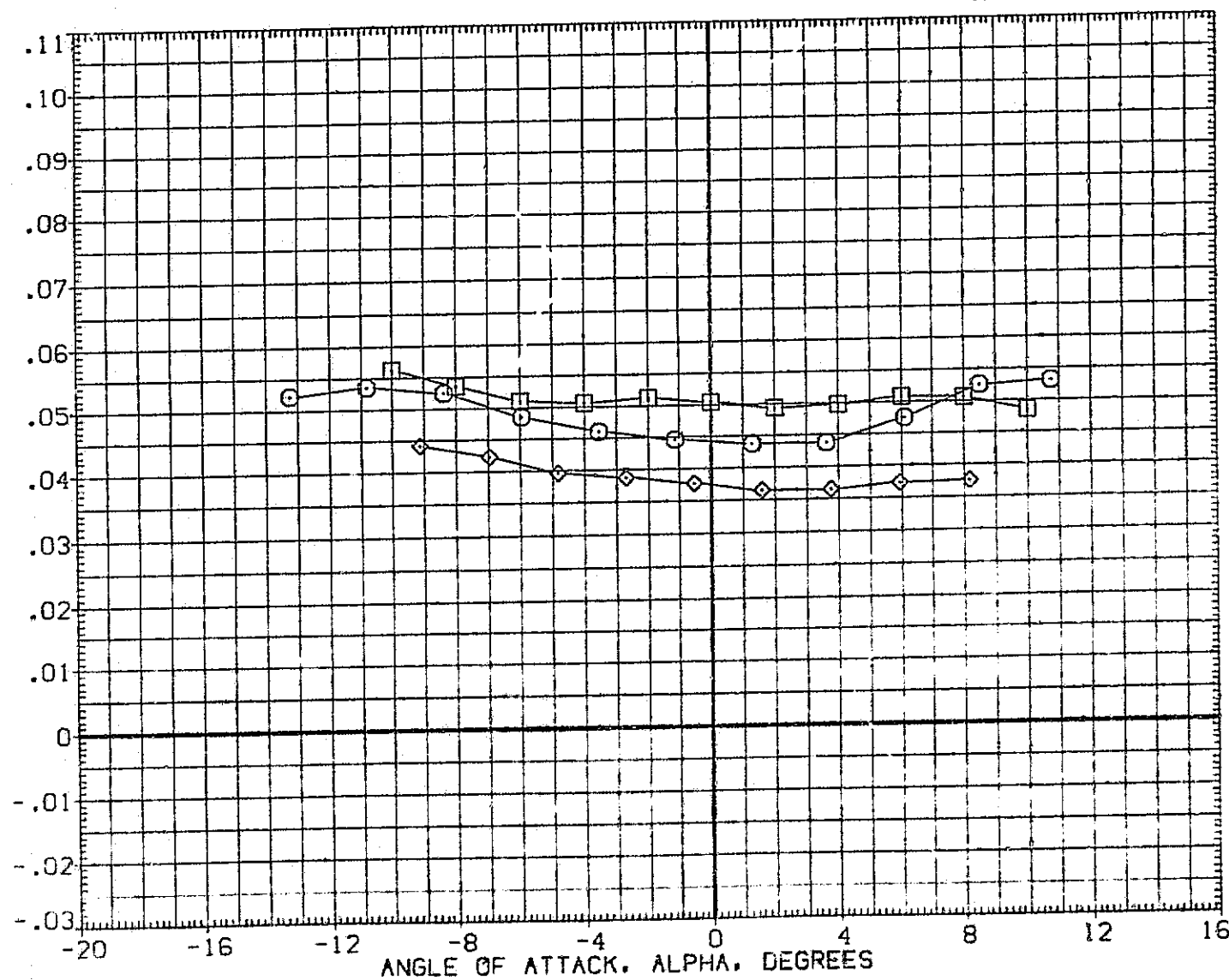


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(C)MACH = .91

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(A1C007)	MSFC 594(1A33) 740TS (TIPISIP201)	
(V1C017)	DATA NOT AVAILABLE	
(A1C019)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

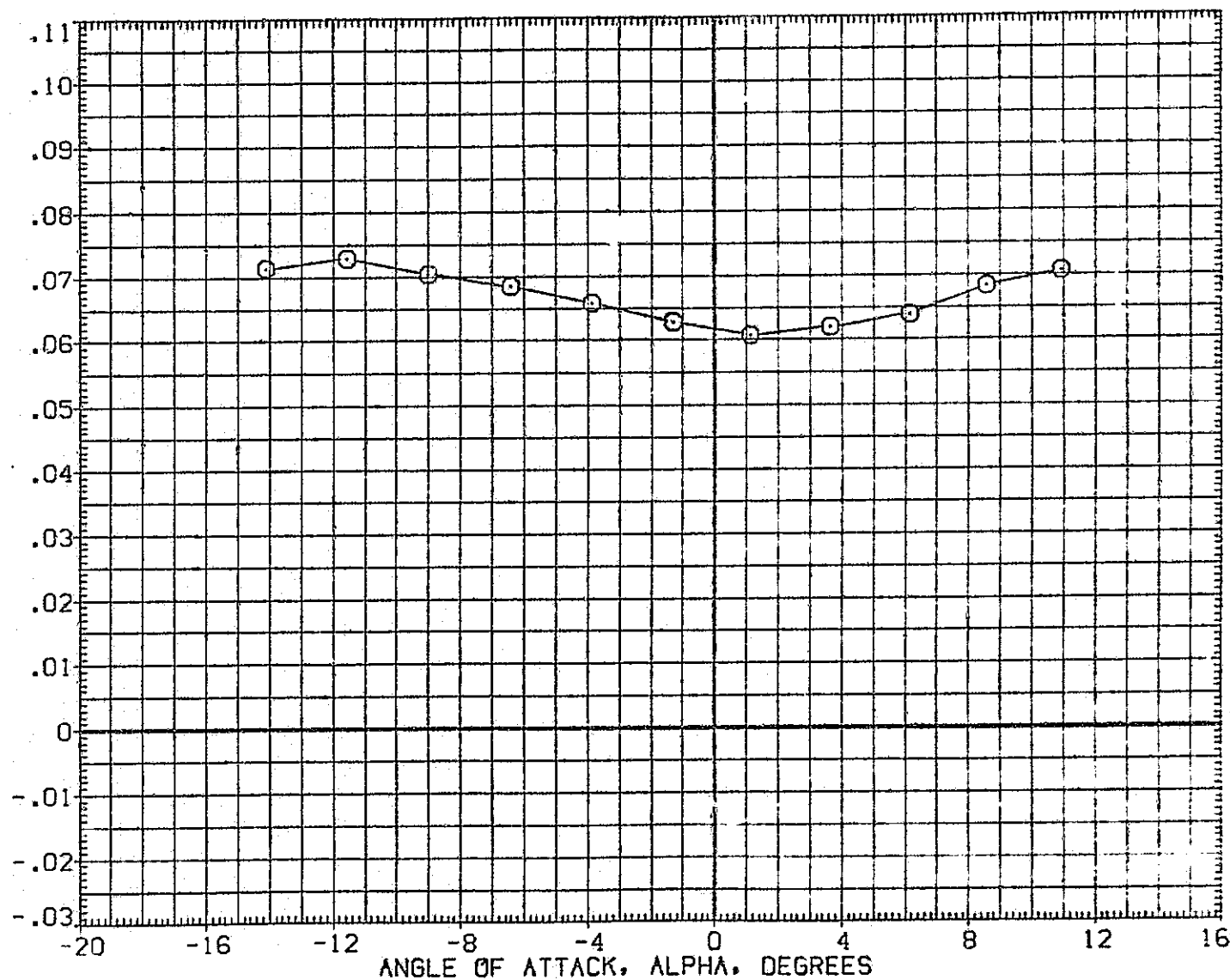


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(AIC019)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

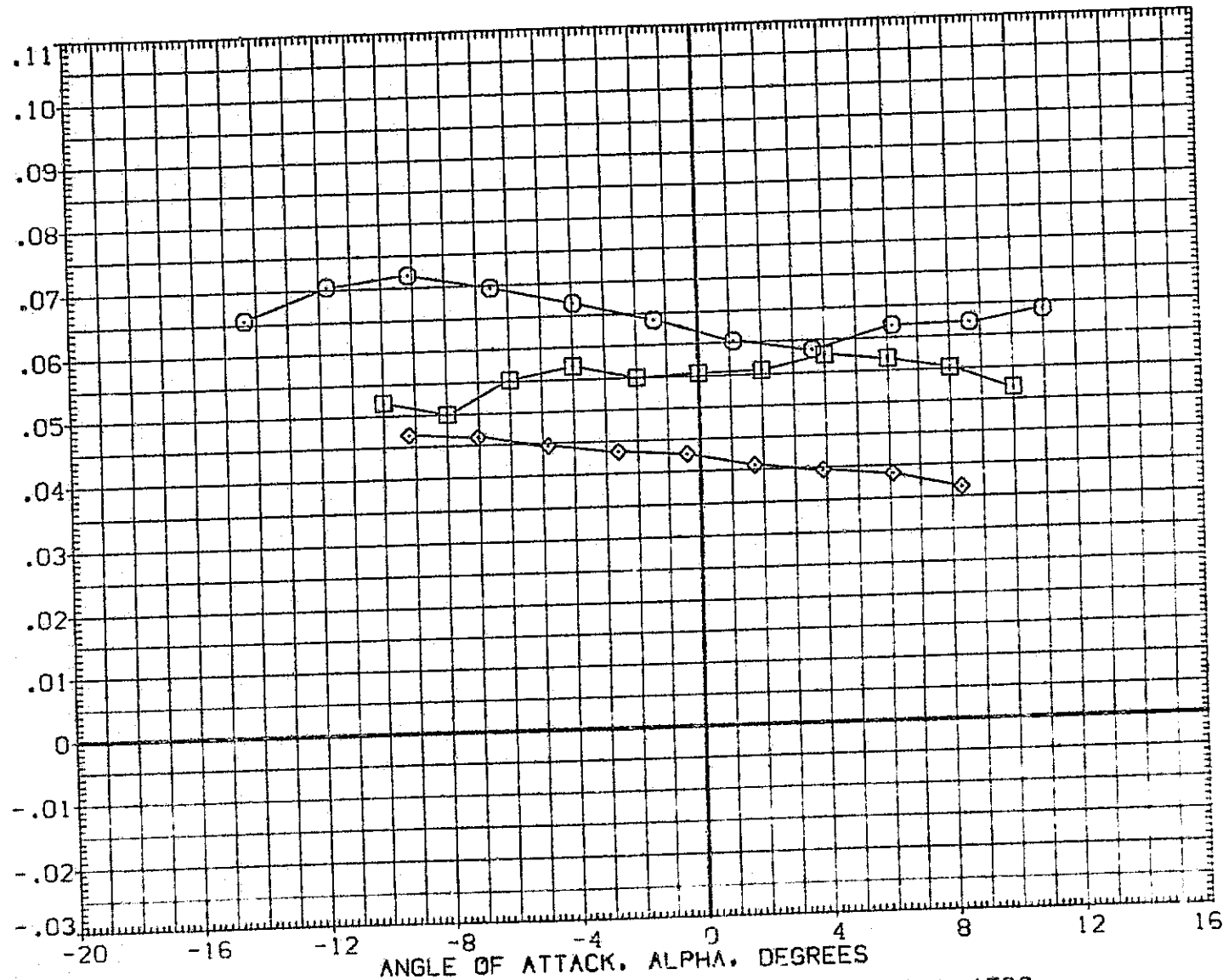


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(C)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORBIT STING
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VICO17)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(AIC019)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0010	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

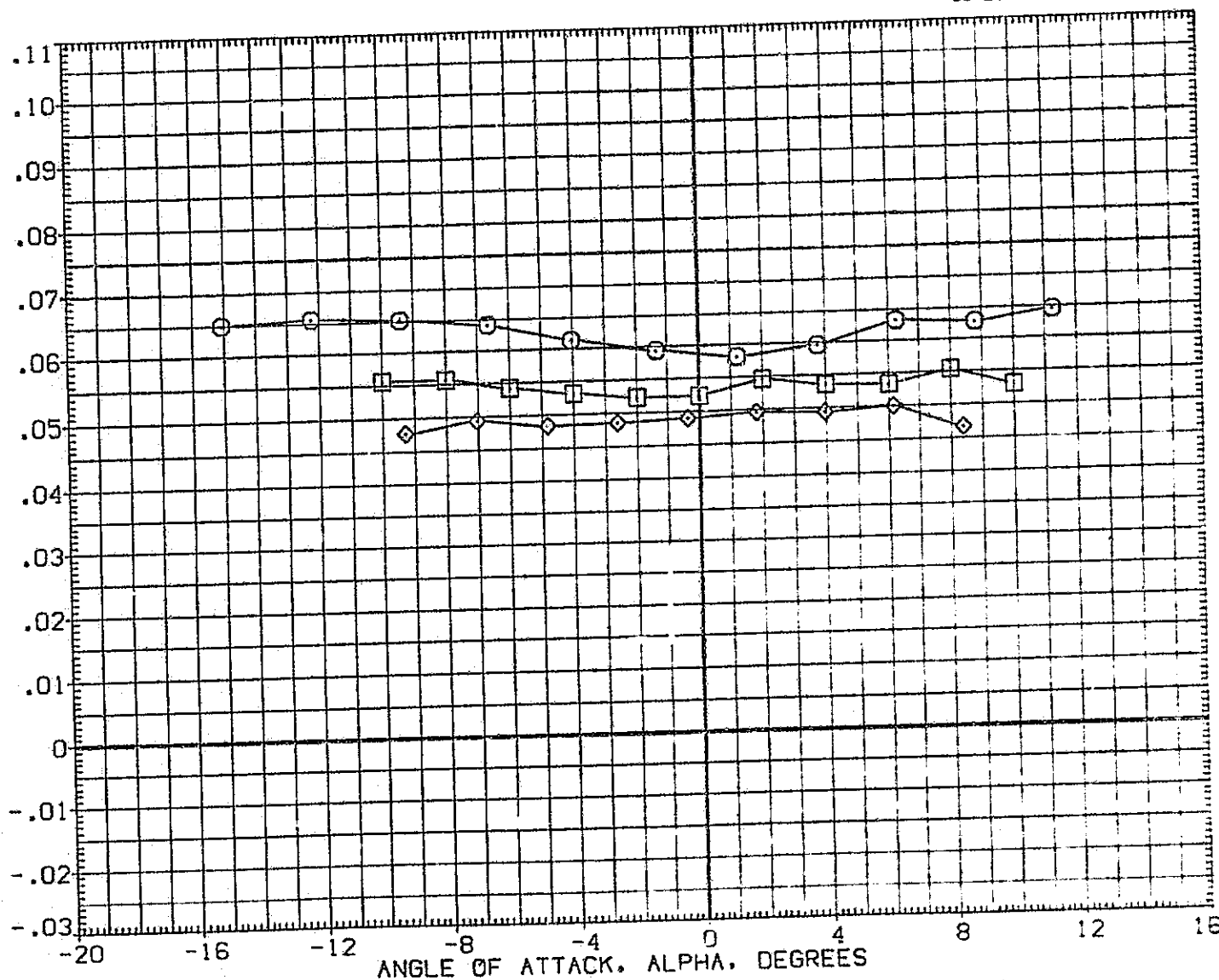


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(F)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(AIC019)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

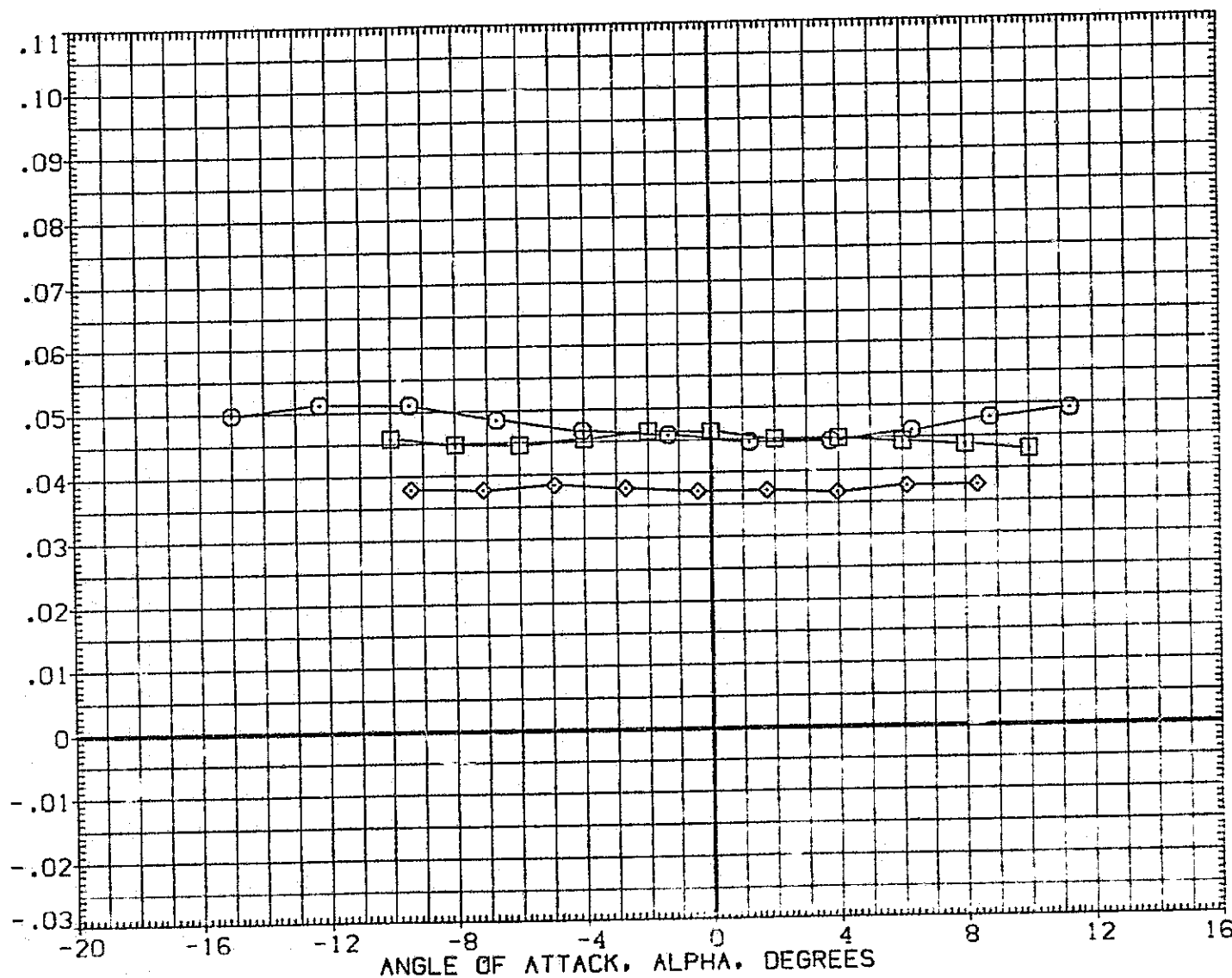


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(G)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(AIC019)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT.
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

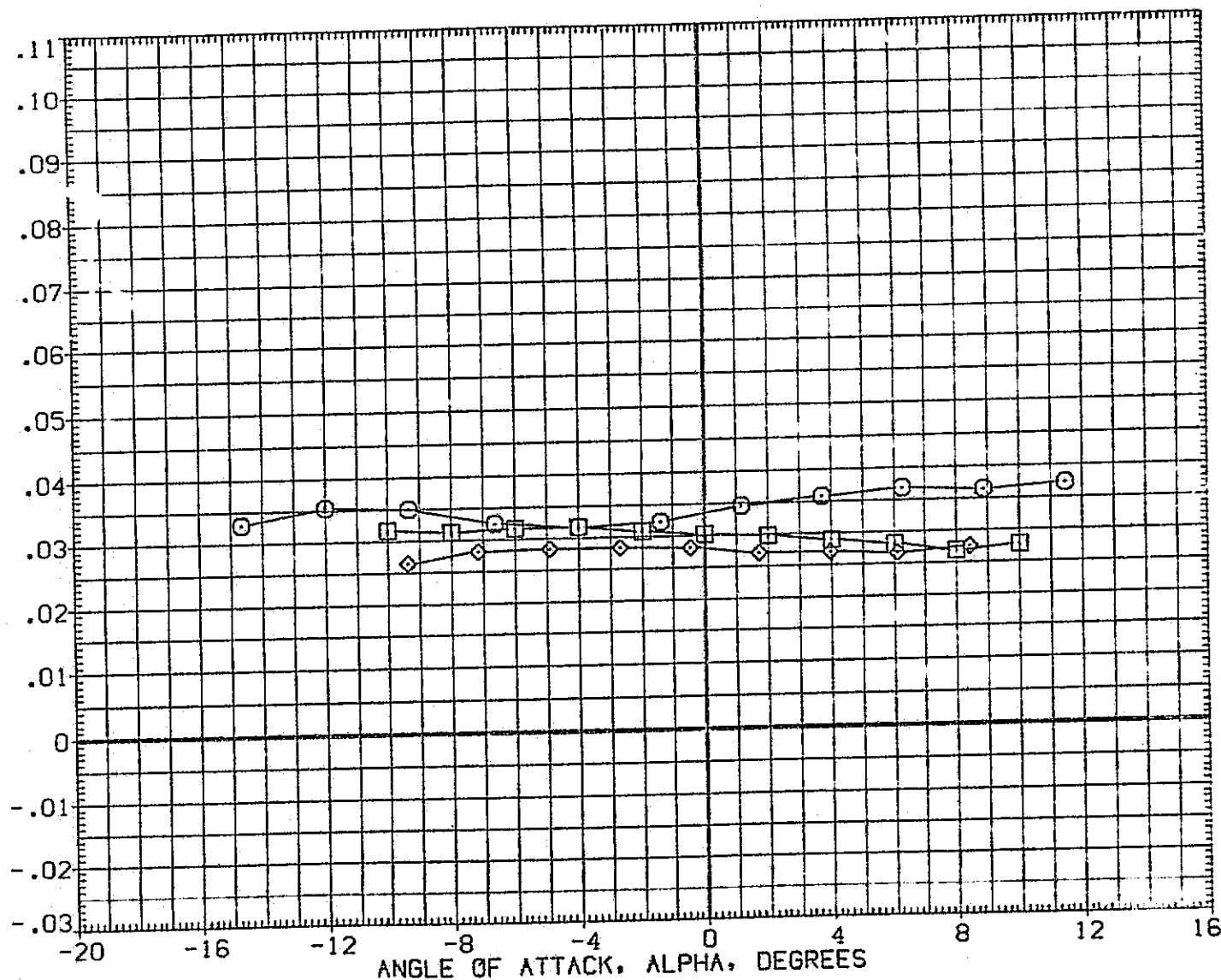


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(H)MACH = 1.97

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VICO17)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(AIC019)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

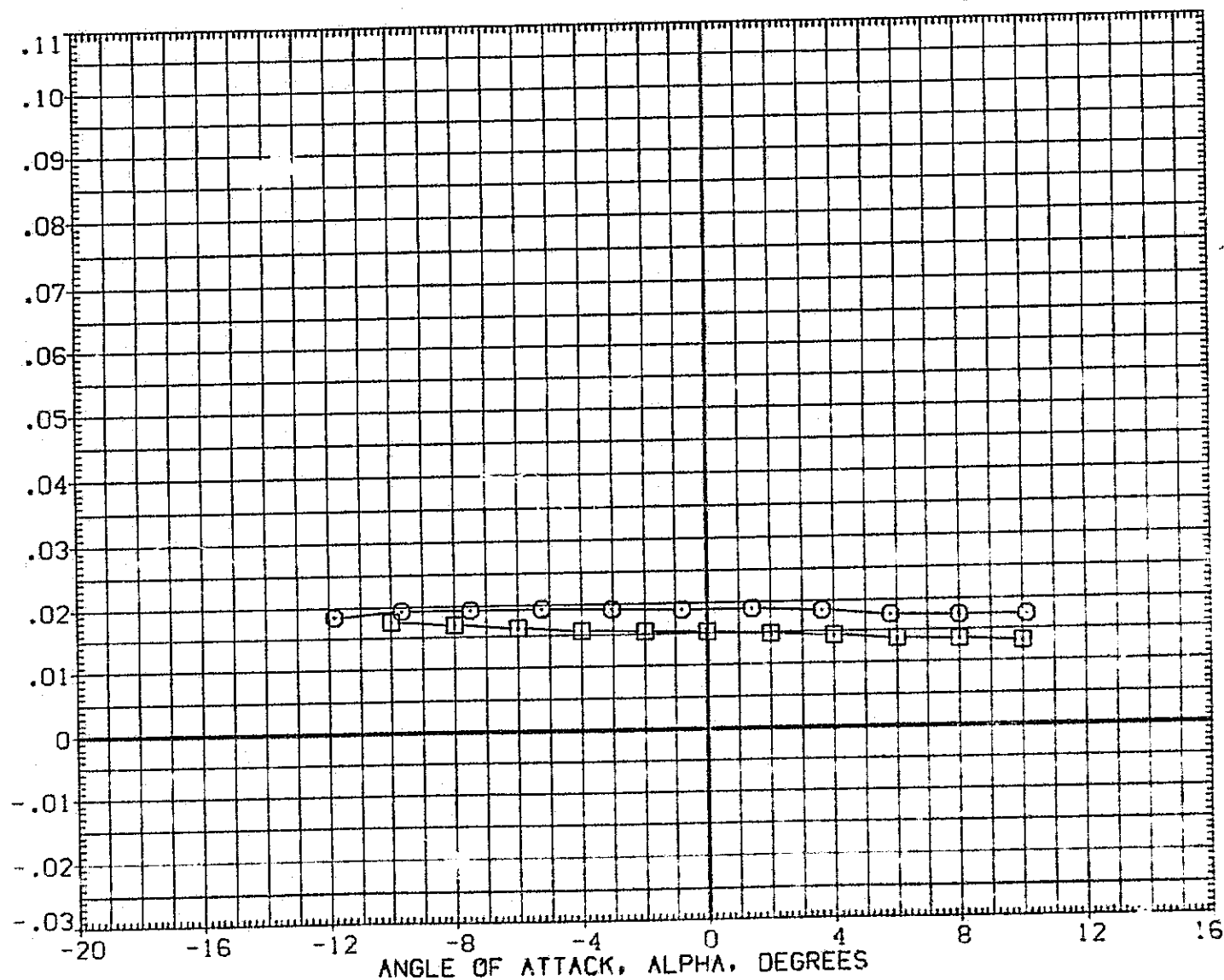


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
[AIC007]	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
[VICO17]	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
[AIC019]	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRD	976.0000	IN. XT
YMRD	.0000	IN. YT
ZMRD	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

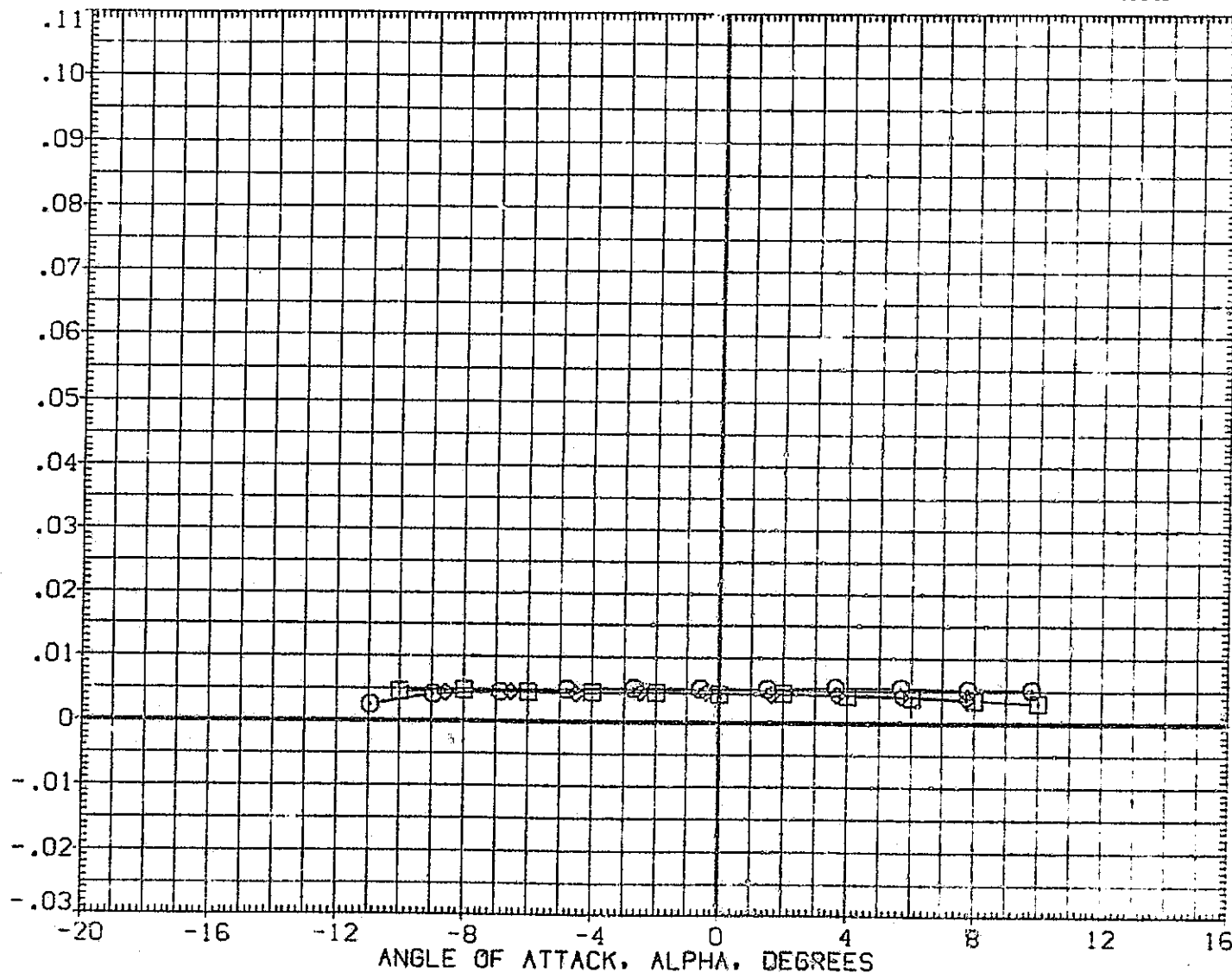


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(AIC007)	MSFC 594(1A33) 740TS (TIP1S1P201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIP1S1P201)	FORKED STING
(AIC019)	MSFC 594(1A33) 740TS (TIP1S1P201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{B0}

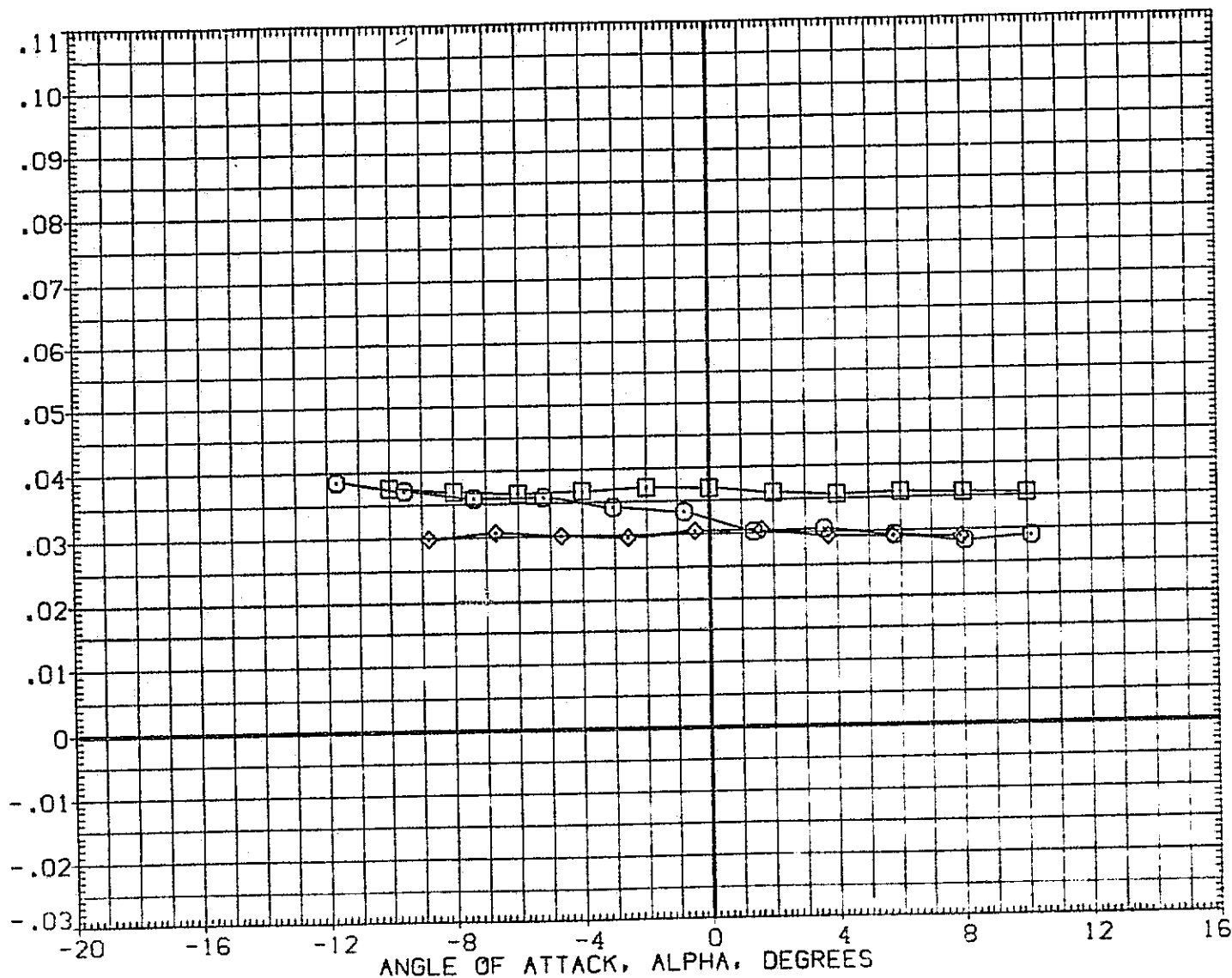


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VICO17)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(AIC019)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

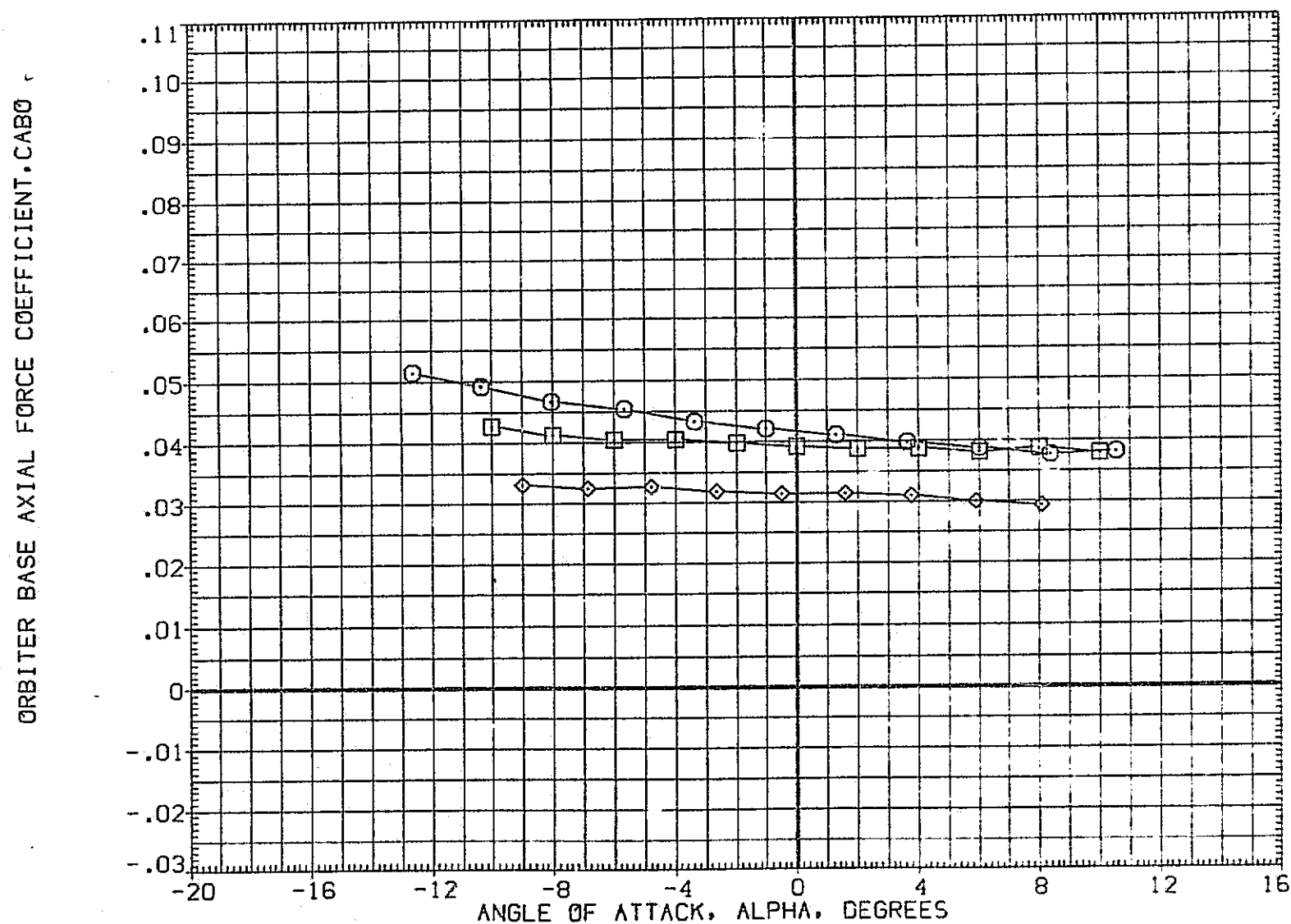


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C007) ○	MSFC 594(1A33) 740TS (TIP)SIP201 ORB STING
(V1C017) □	MSFC 594(1A33) 740TS (TIP)SIP201 FORKED STING
(A1C019) ◇	MSFC 594(1A33) 740TS (TIP)SIP201 FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0010	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

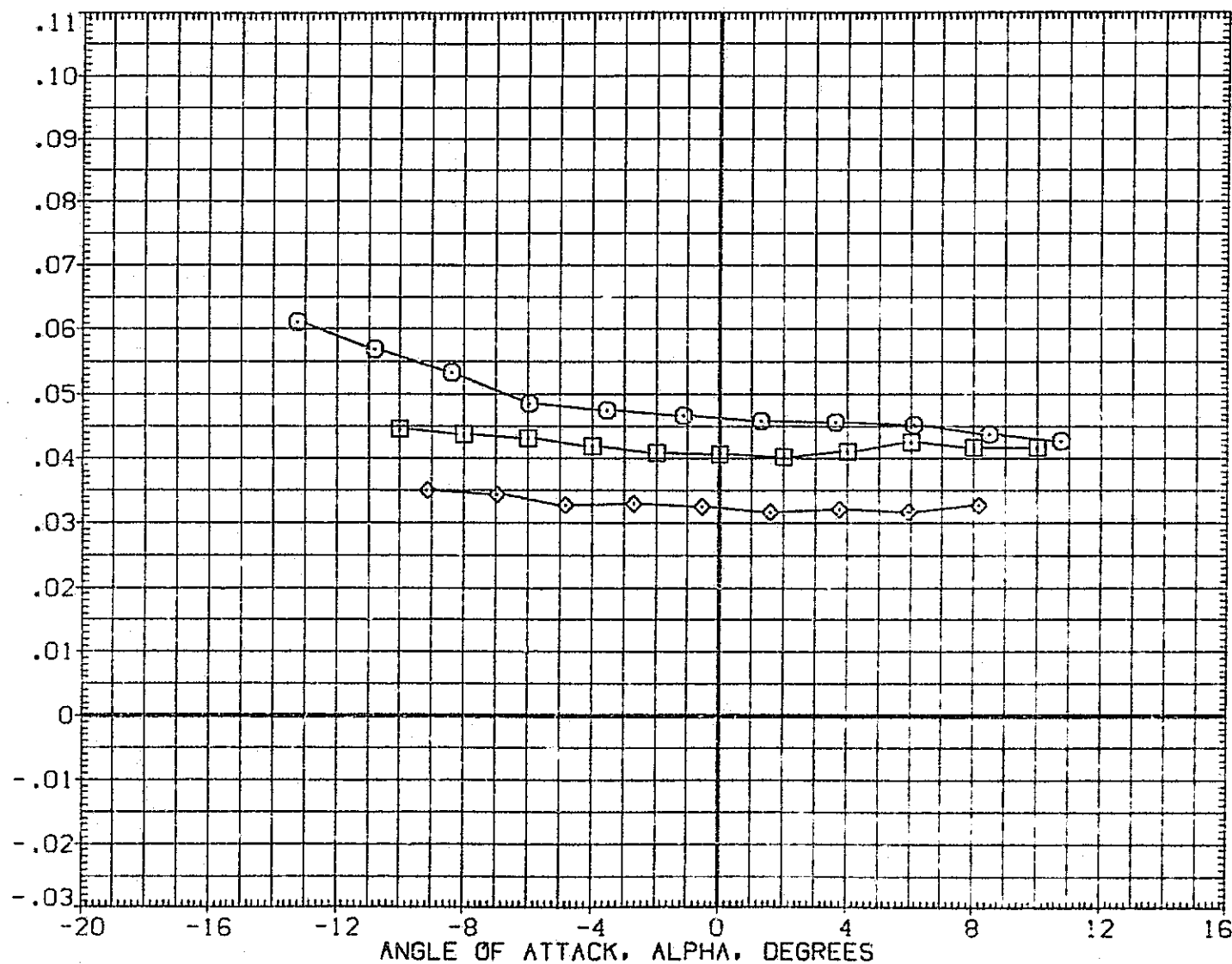




FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(C)MACH = .91

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007) 	MSFC S94(1A33) 740TS (TIPISIP201)	
(VICO17) 	DATA NOT AVAILABLE	
(AIC019) 	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{ABO}

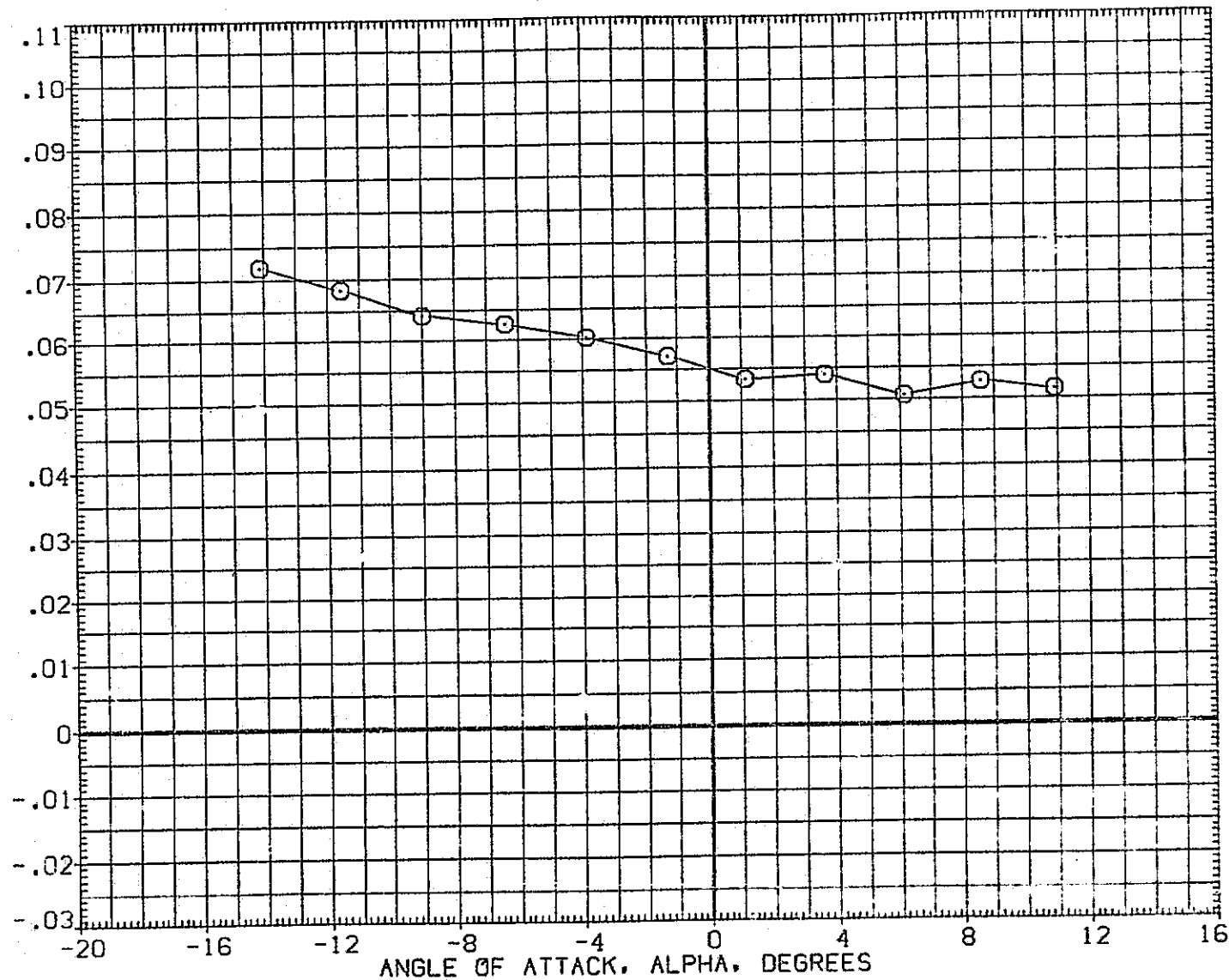


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC007) ○	MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING
(VICO17) □	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING
(AIC019) ◇	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{ABO}

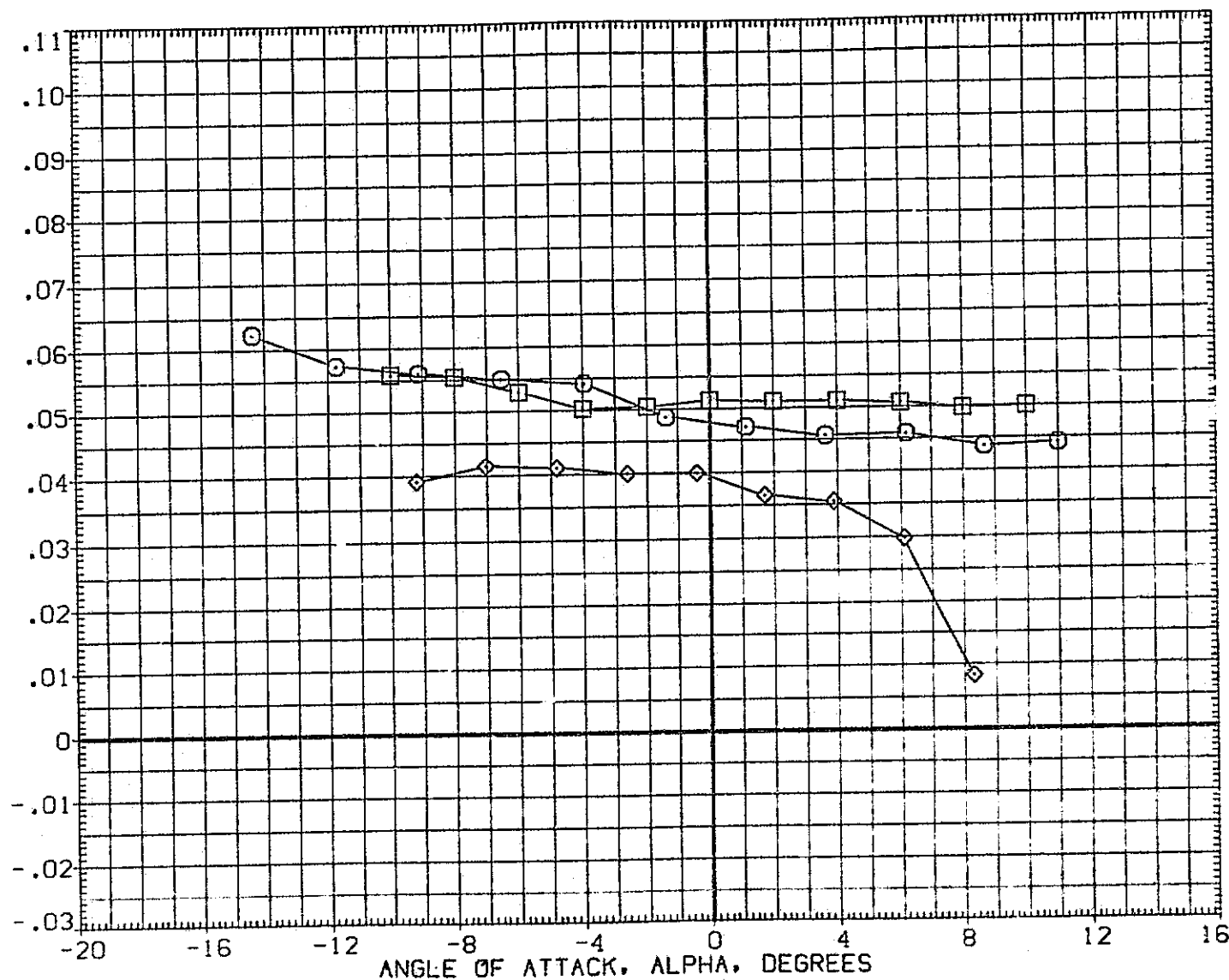


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(AIC019)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

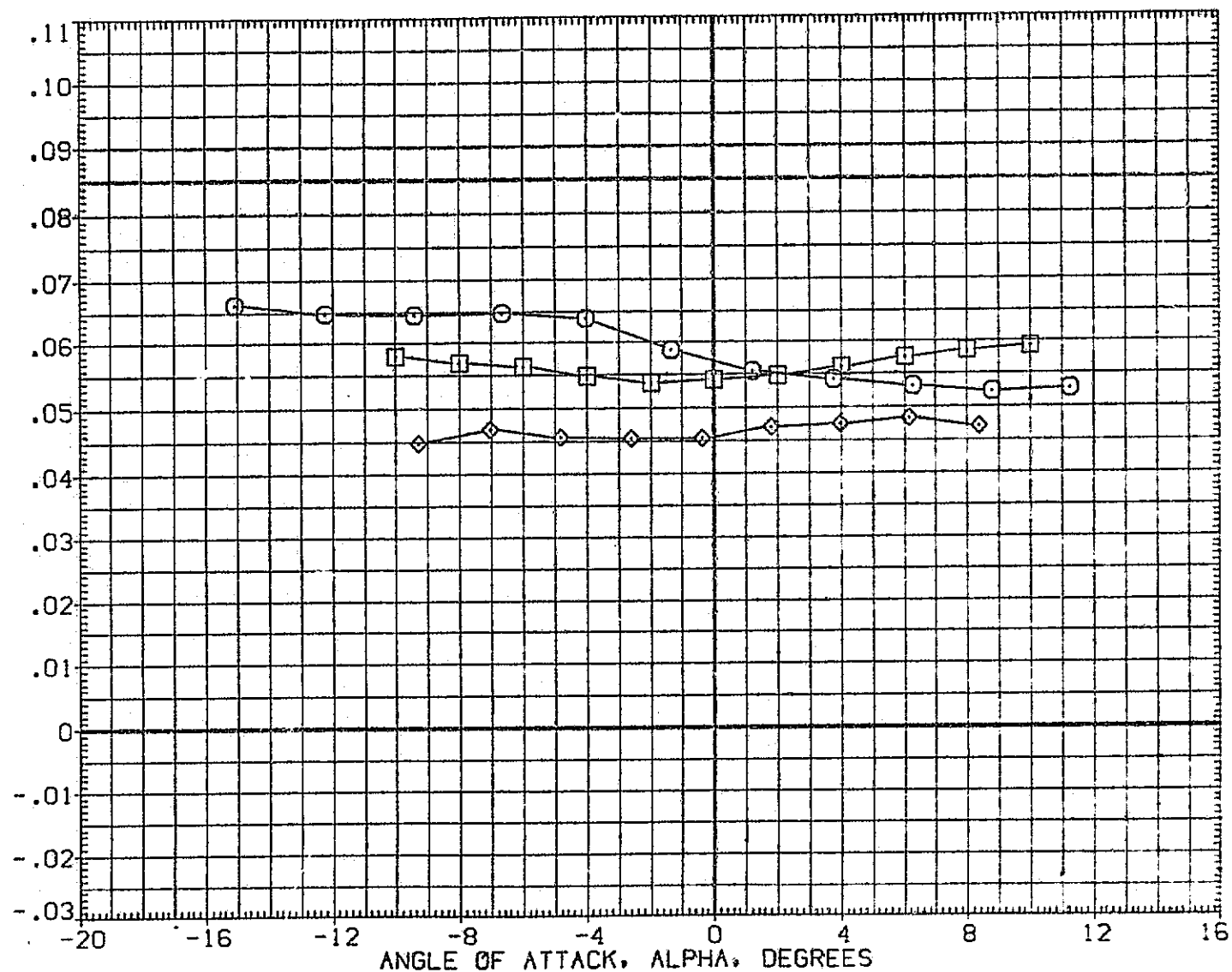


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(F)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
{AIC007}	MSFC 594(I A33) 740TS (TIPISIP201) ORB STING
{VICO17}	MSFC 594(I A33) 740TS (TIPISIP201) FORKED STING
{AIC019}	MSFC 594(I A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

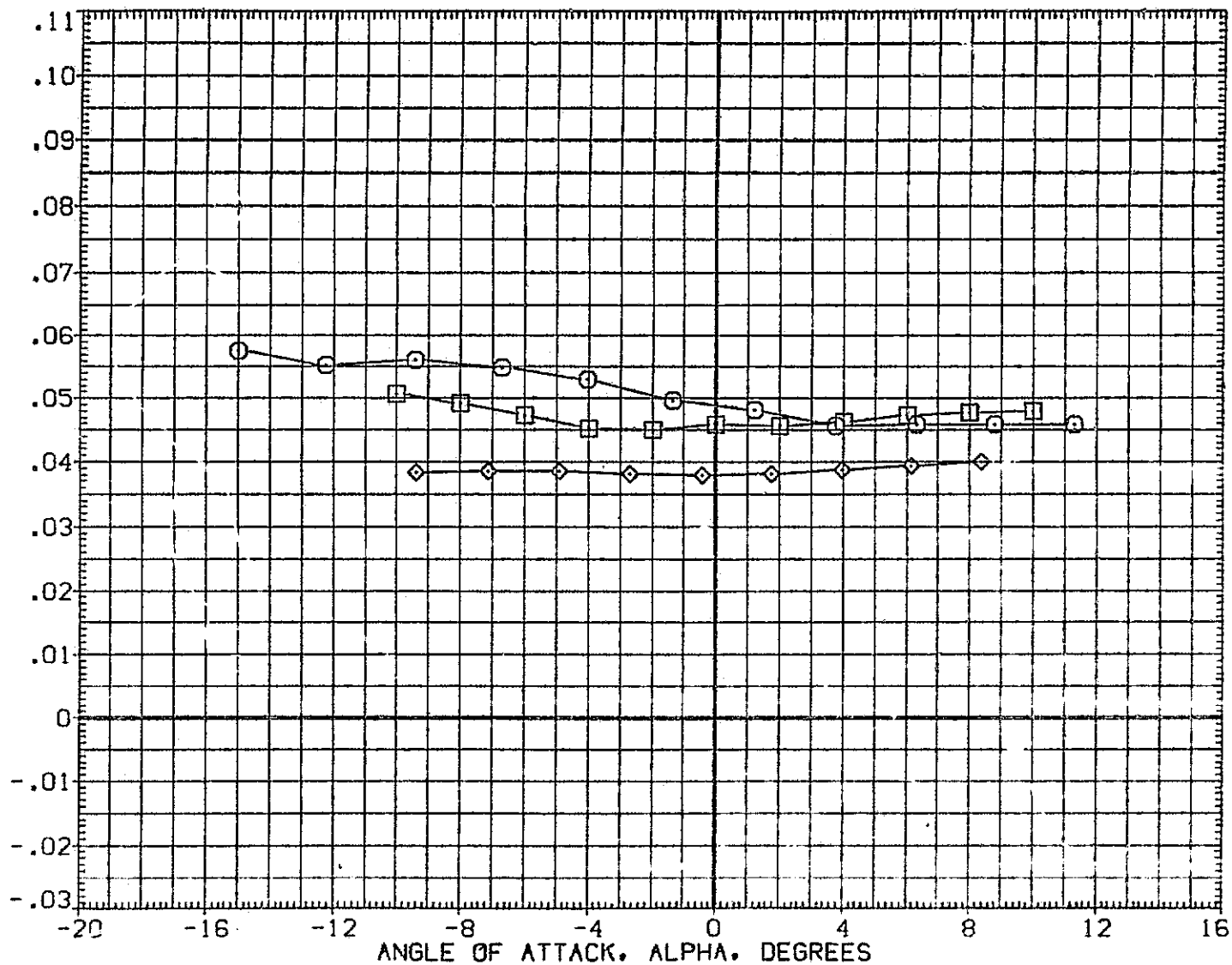


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(G)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORBITER STING
(AIC007)	MSFC 594(A33) 740TS (TIP1SIP201)	ORB STING
(VIC017)	MSFC 594(A33) 740TS (TIP1SIP201)	FORKED STING
(AIC019)	MSFC 594(A33) 740TS (TIP1SIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

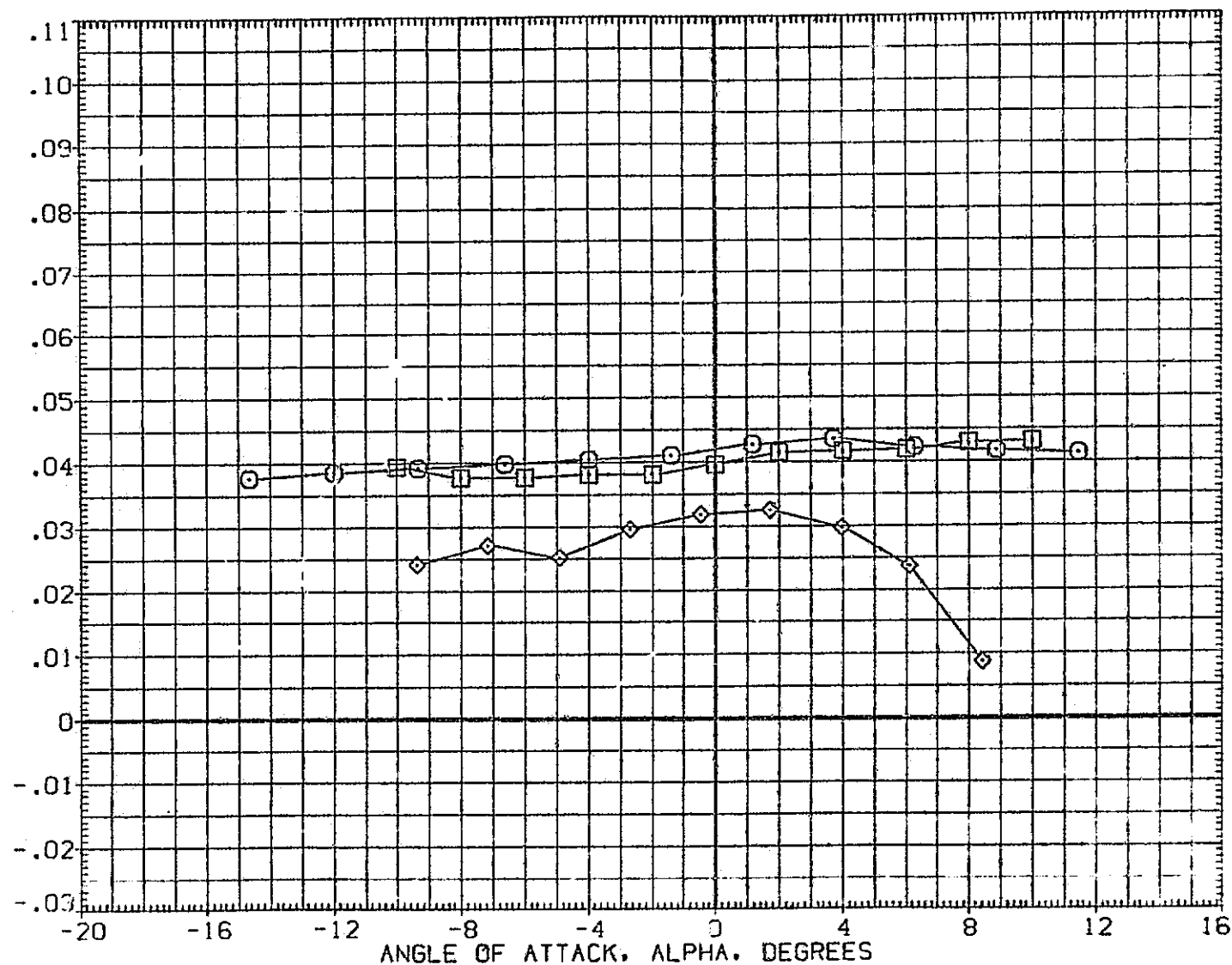


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(H)MACH = 1.97

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
[AIC007]	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
[VICO17]	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
[AIC019]	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

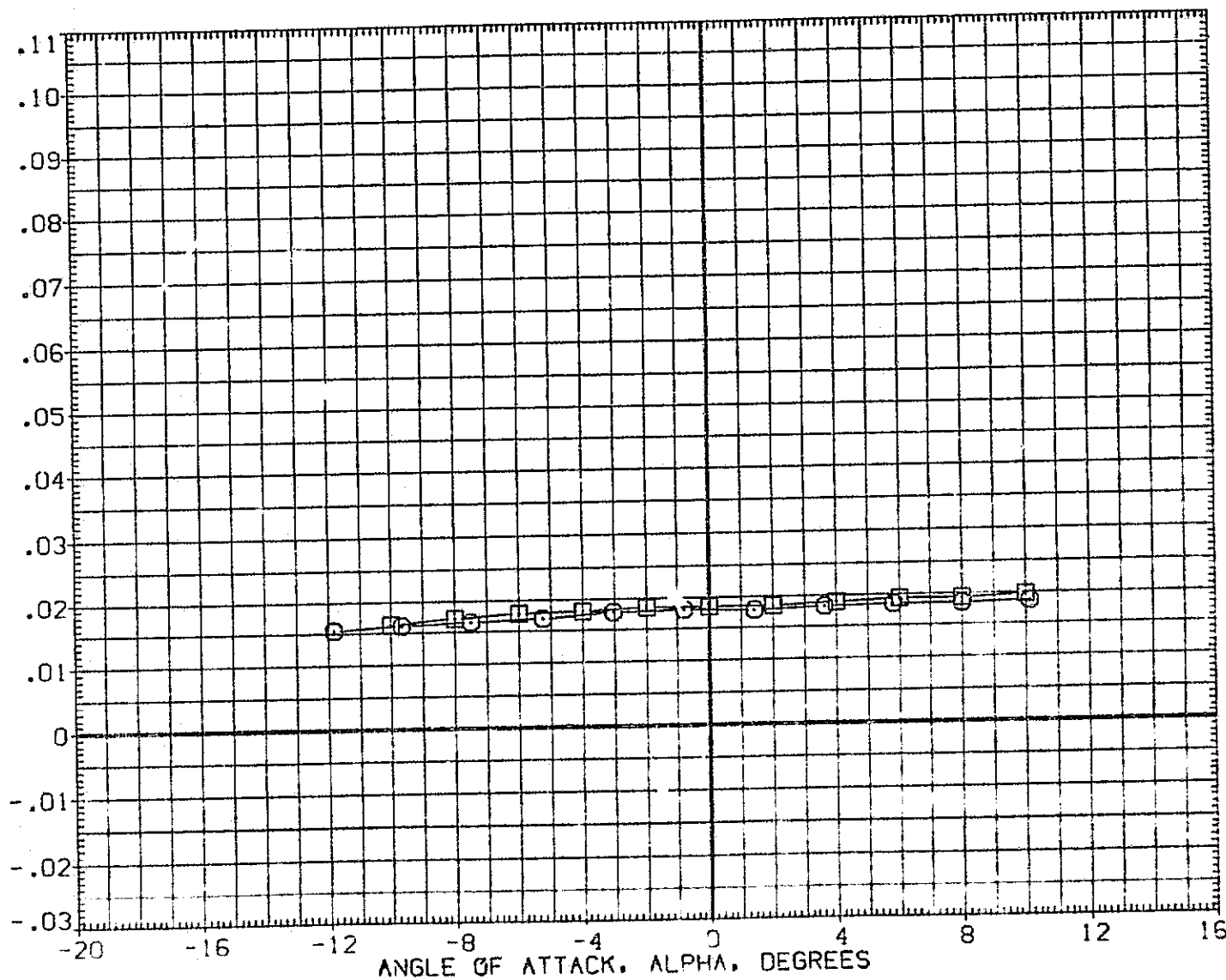


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(AIC017)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(AIC019)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

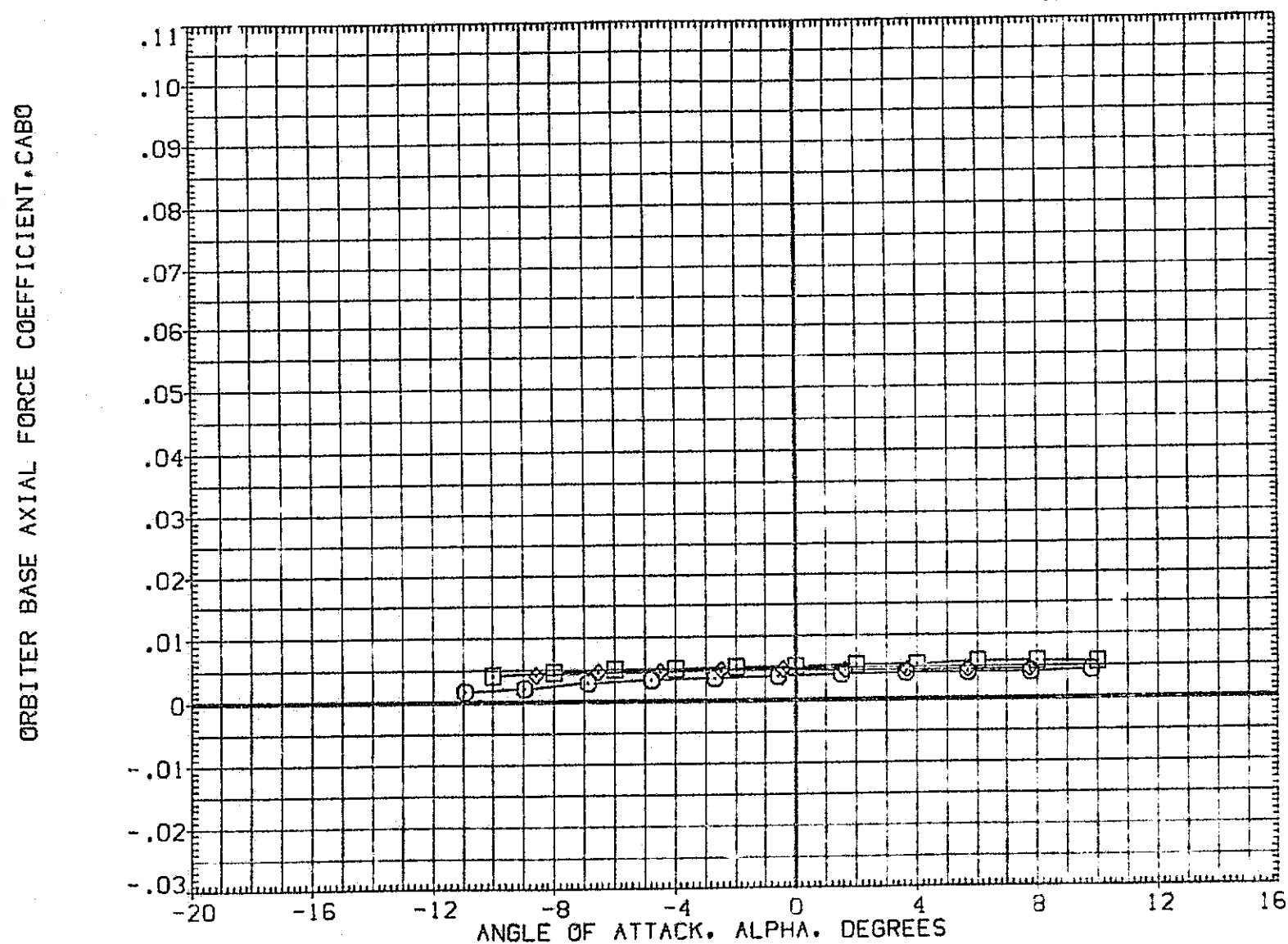


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) ○	MSFC 594(1A33) 740TS (TIPISIP201) GRB STING
(VIC017) □	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC019) ◇	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

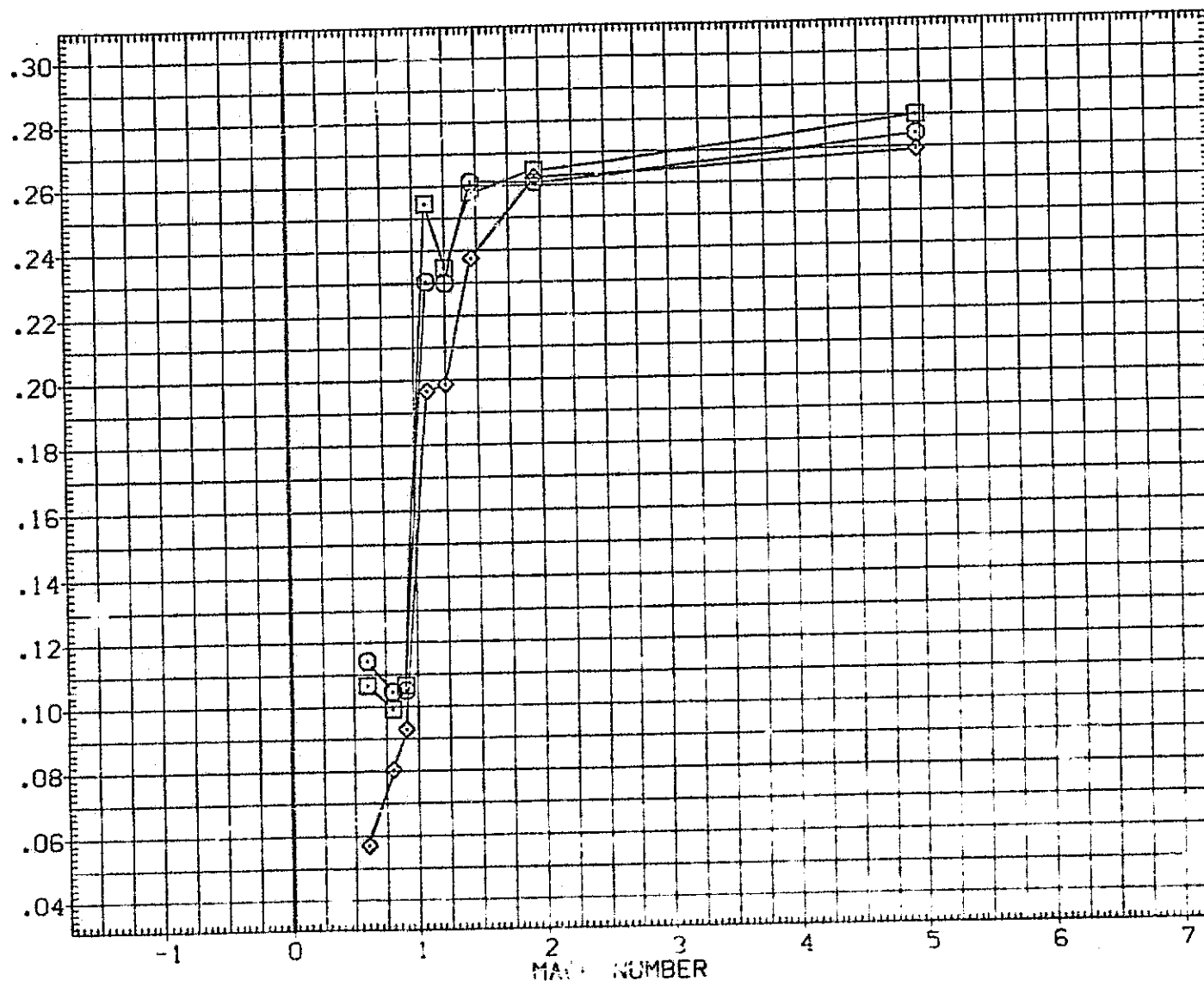


FIG 3 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIG STING
(VIC007)	MSFC 594(A33) 740TS (TIPISIP201)	ORIG STING
(VIC017)	MSFC 594(A33) 740TS (TIPISIP201)	FORKED STING
(VIC019)	MSFC 594(A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

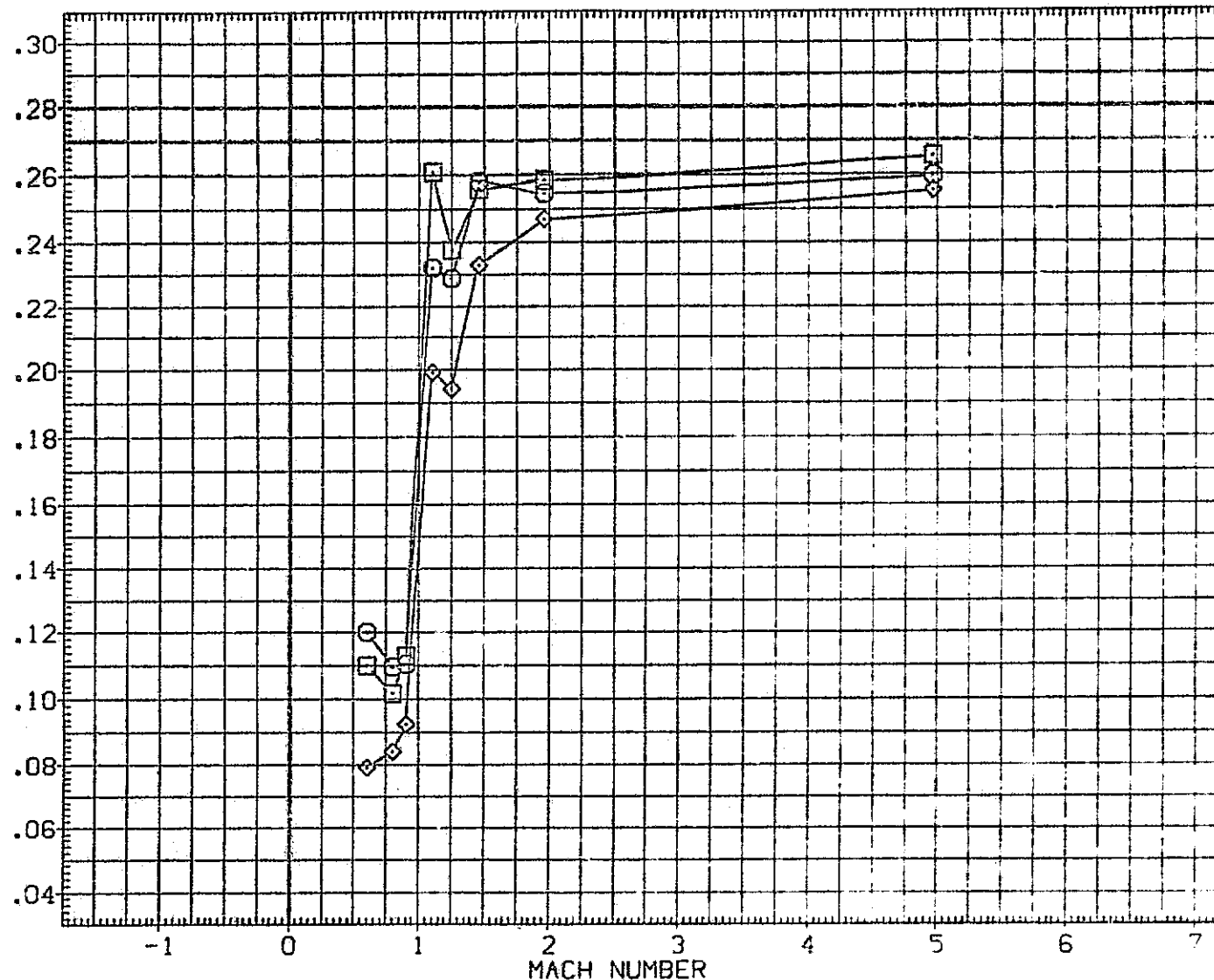


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(B) ALPHA = -8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC007)	MSFC S94(1A33) 740TS (TIP1SIP201)	ORB STING
(VIC017)	MSFC S94(1A33) 740TS (TIP1SIP201)	FORKED STING
(VIC019)	MSFC S94(1A33) 740TS (TIP1SIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

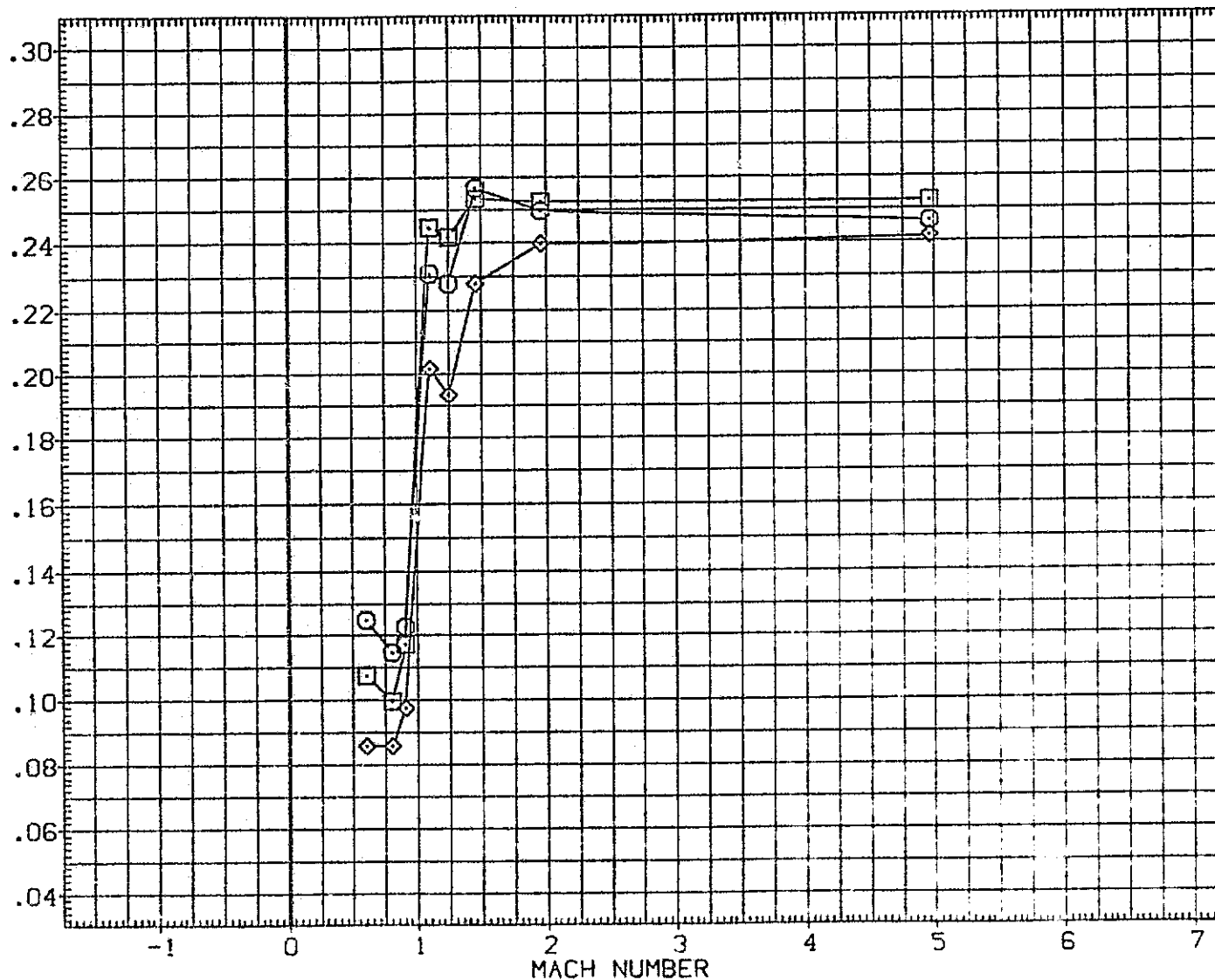


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(C) ALPHA = -6.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC007)	□	MSFC 594(1A33) 740TS (TIP:SP201)	ORB STING
(VIC017)	□	MSFC 594(1A33) 740TS (TIP:SP201)	FORKED STING
(VIC019)	◇	MSFC 594(1A33) 740TS (TIP:SP201)	FORKED STING

REFERENCE INFORMATION

SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

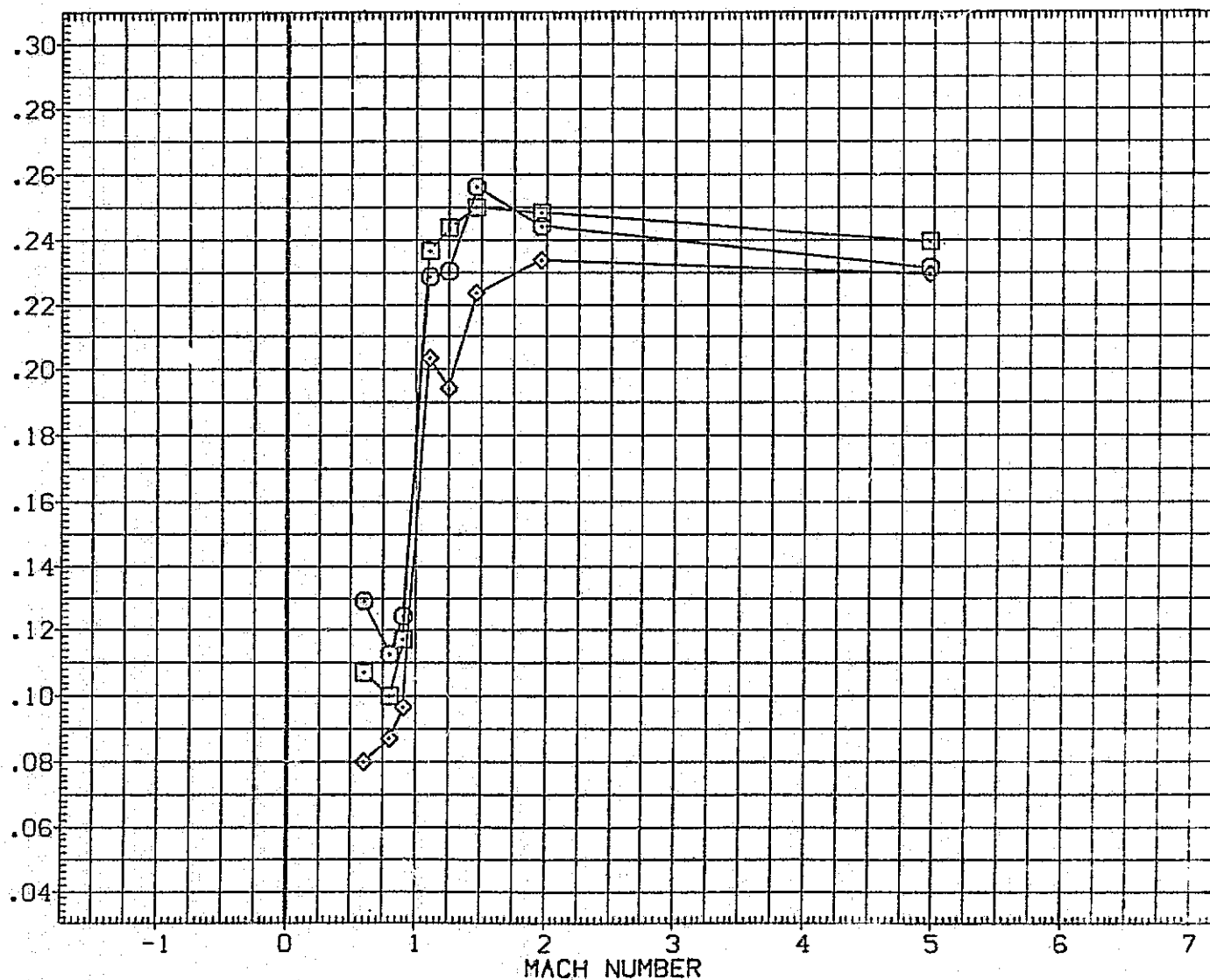


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(D) ALPHA = -4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) ○	MSFC S94(1A33) 740TS (TIPISIP201) ORB STING
(VIC017) □	MSFC S94(1A33) 740TS (TIPISIP201) FORKED STING
(VIC019) ◇	MSFC S94(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BRFF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

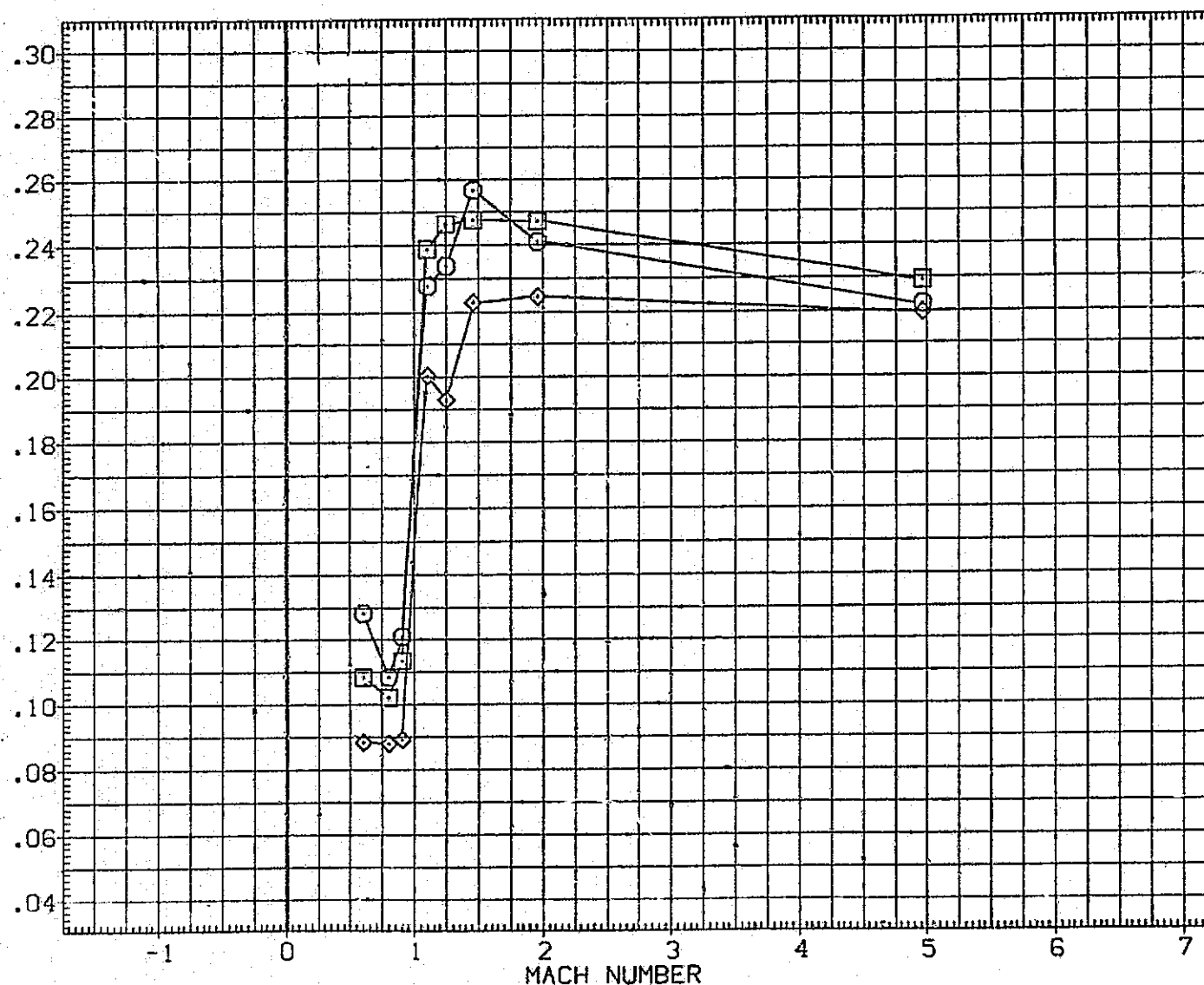


FIG 3 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(E) ALPHA = -2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) ○	MSFC 594(1A33) 740TS (T1P1SIP201) ORB STING
(VIC017) □	MSFC 594(1A33) 740TS (T1P1SIP201) FORKED STING
(VIC019) ◇	MSFC 594(1A33) 740TS (T1P1SIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

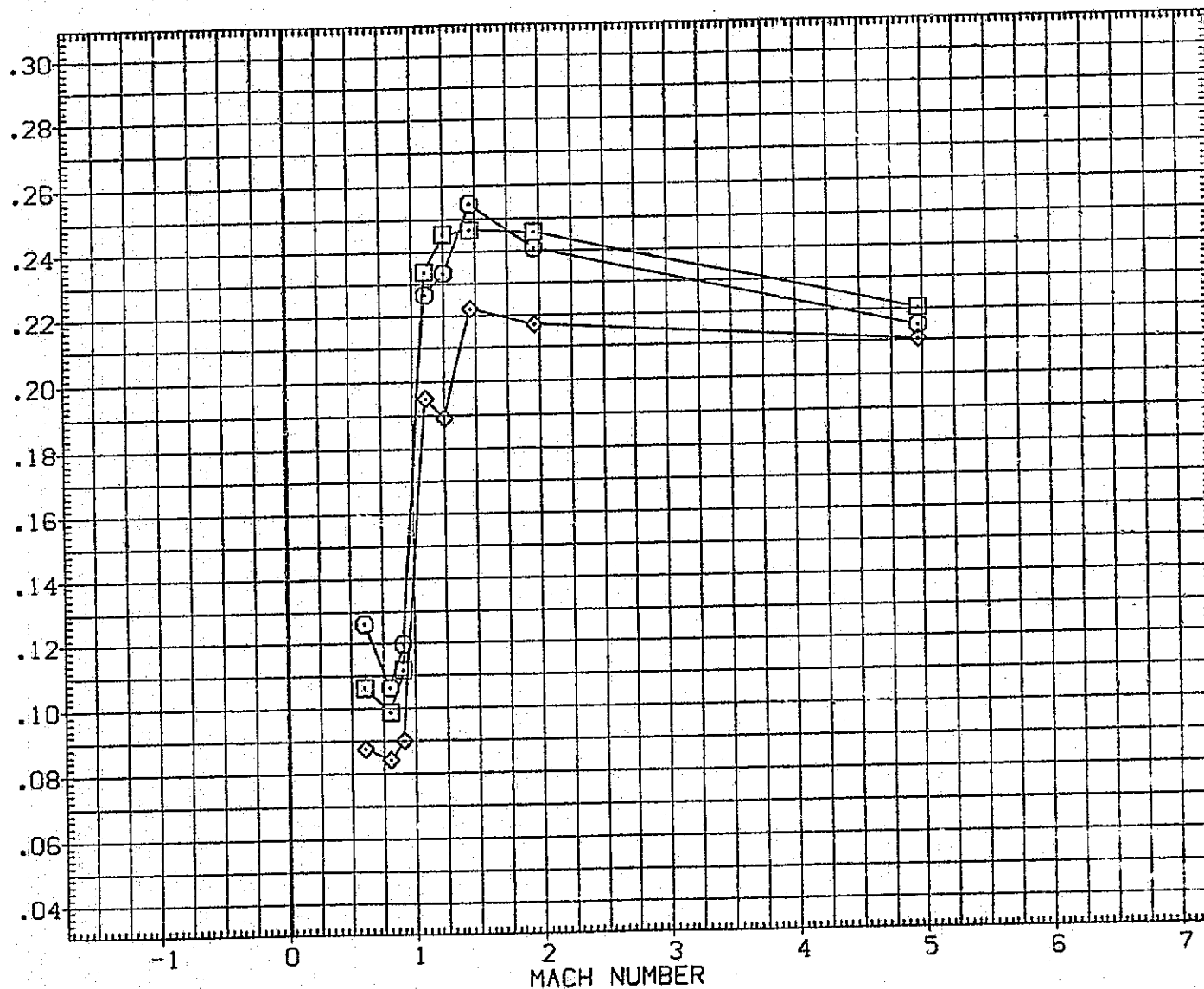


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(F) ALPHA = .00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) ○	MSFC 594(1A33) 740TS (TIP1SIP201) ORB STING
(VIC017) □	MSFC 594(1A33) 740TS (TIP1SIP201) FORKED STING
(VIC019) ◇	MSFC 594(1A33) 740TS (TIP1SIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

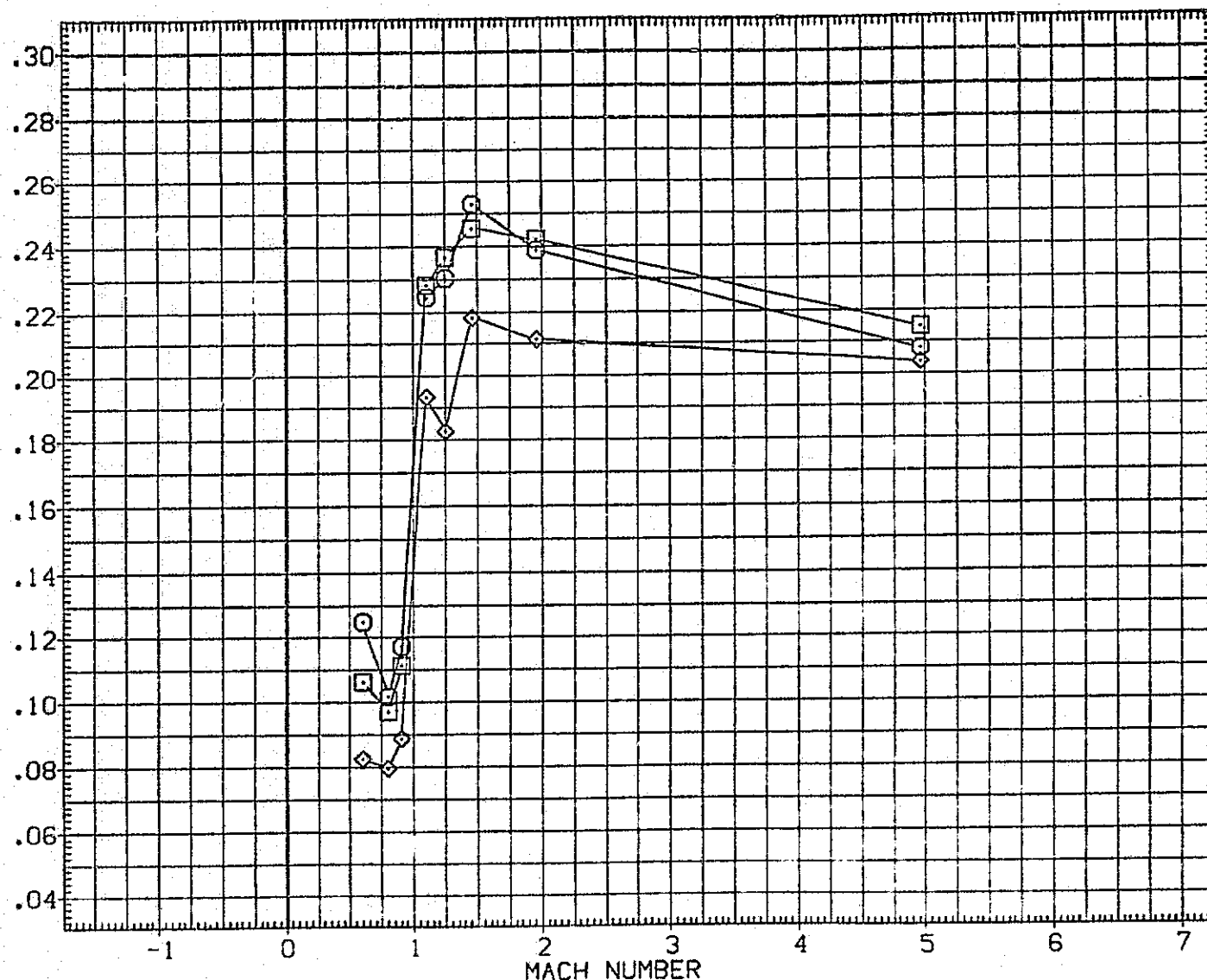


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(G)ALPHA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

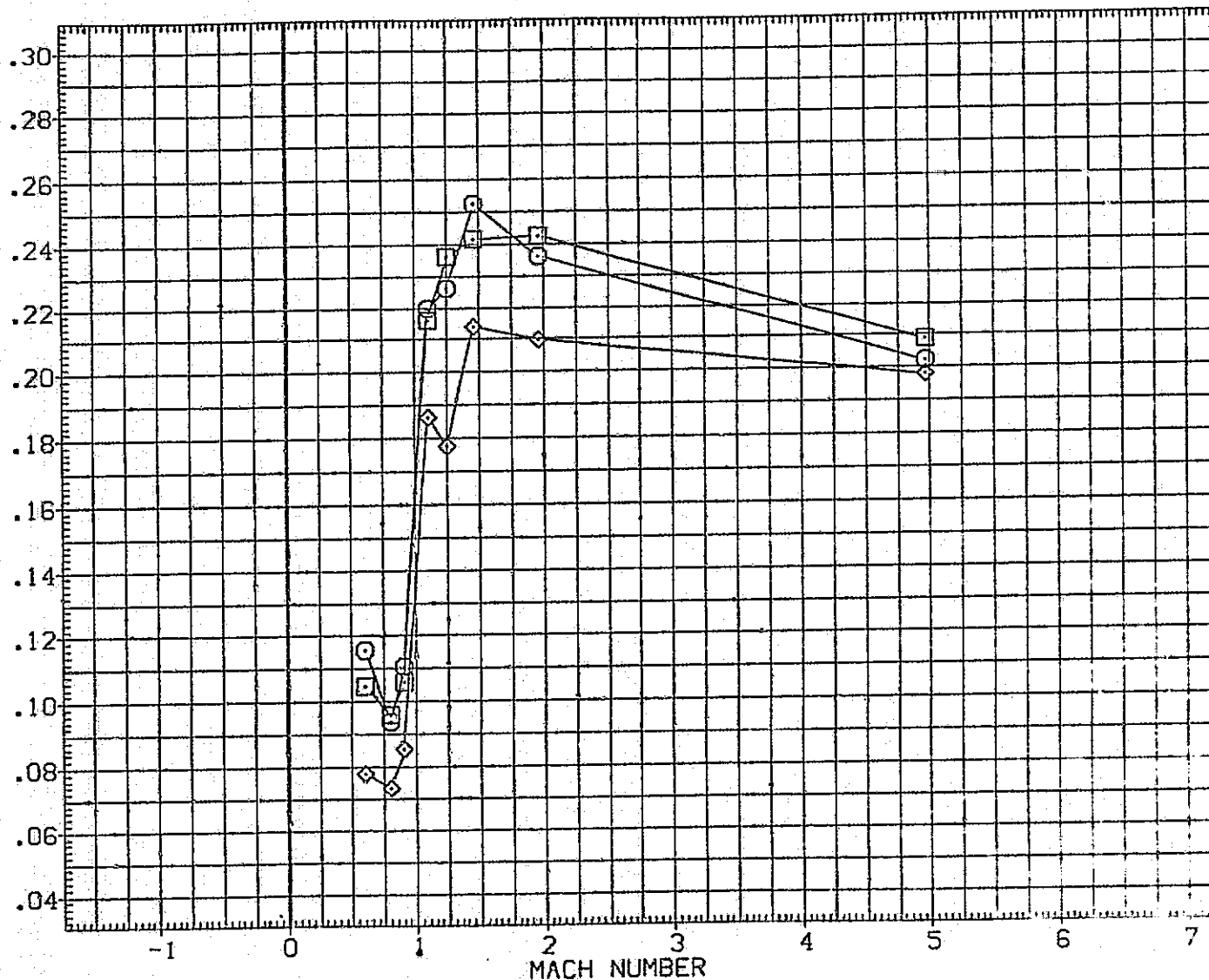


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(H)ALPHA = 4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) ○	MSFC 594(A33) 740TS (TIPISIP201) ORB STING
(VIC017) □	MSFC 594(A33) 740TS (TIPISIP201) FORKED STING
(VIC019) ◇	MSFC 594(A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION

SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

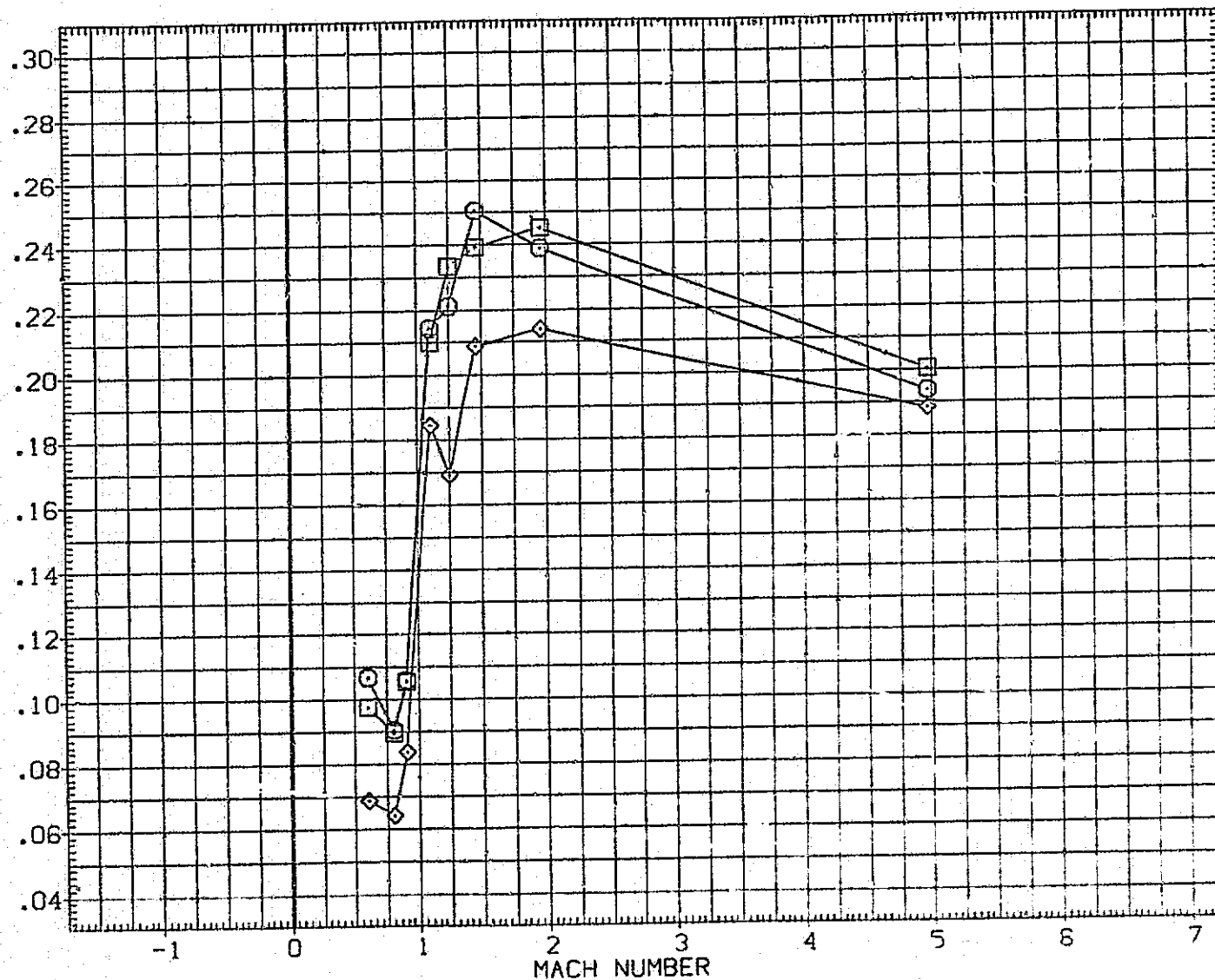


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(1) ALPHA = 6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VICO07) □	MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING
(VICO17) □	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING
(VICO19) ◇	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

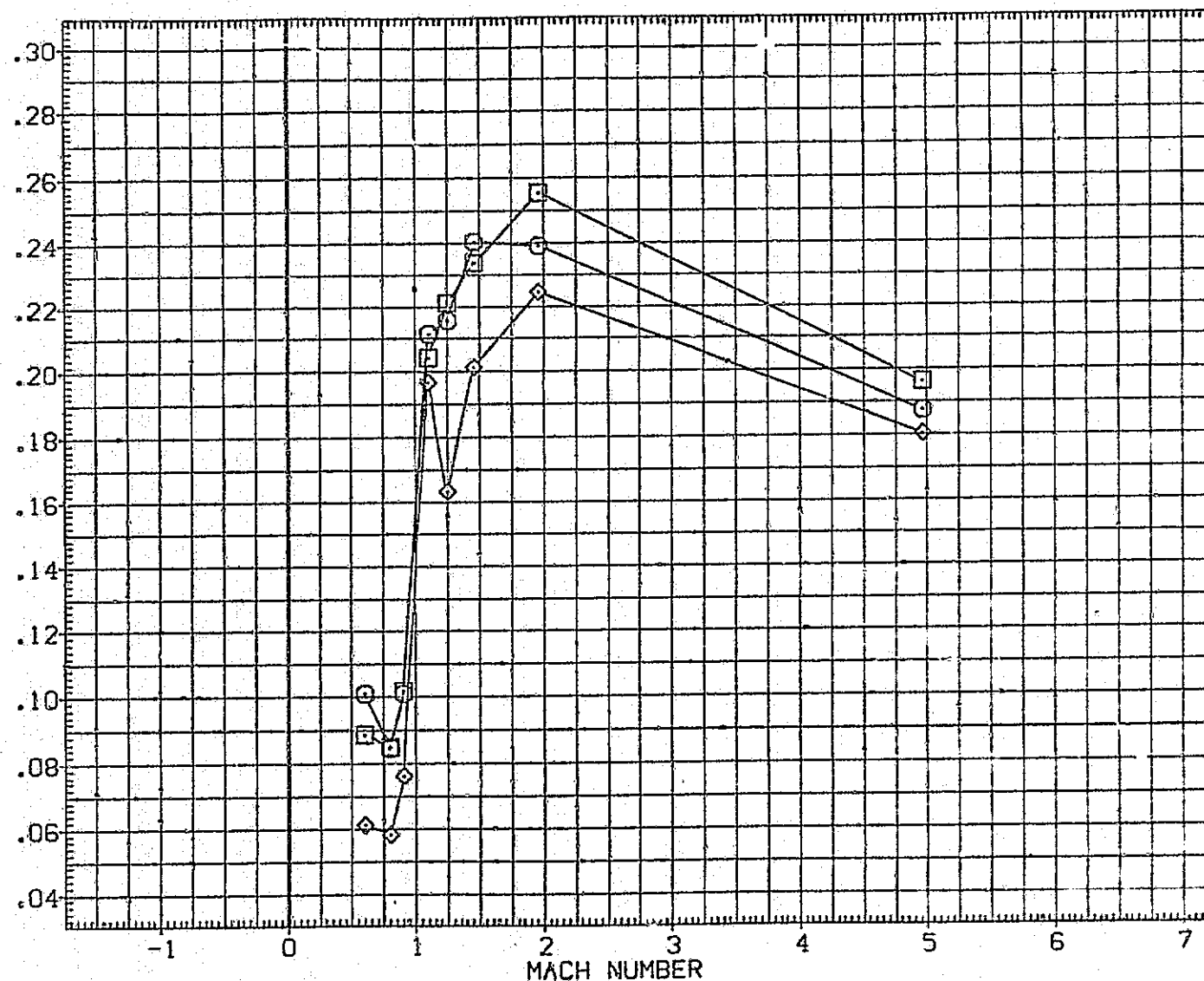


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(J)ALPHA = 8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC007)	MSFC 594(A33) 740TS (TIP(SIP201))	ORB STING
(VIC017)	MSFC 594(A33) 740TS (TIP(SIP201))	FORKED STING
(VIC019)	MSFC 594(A33) 740TS (TIP(SIP201))	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

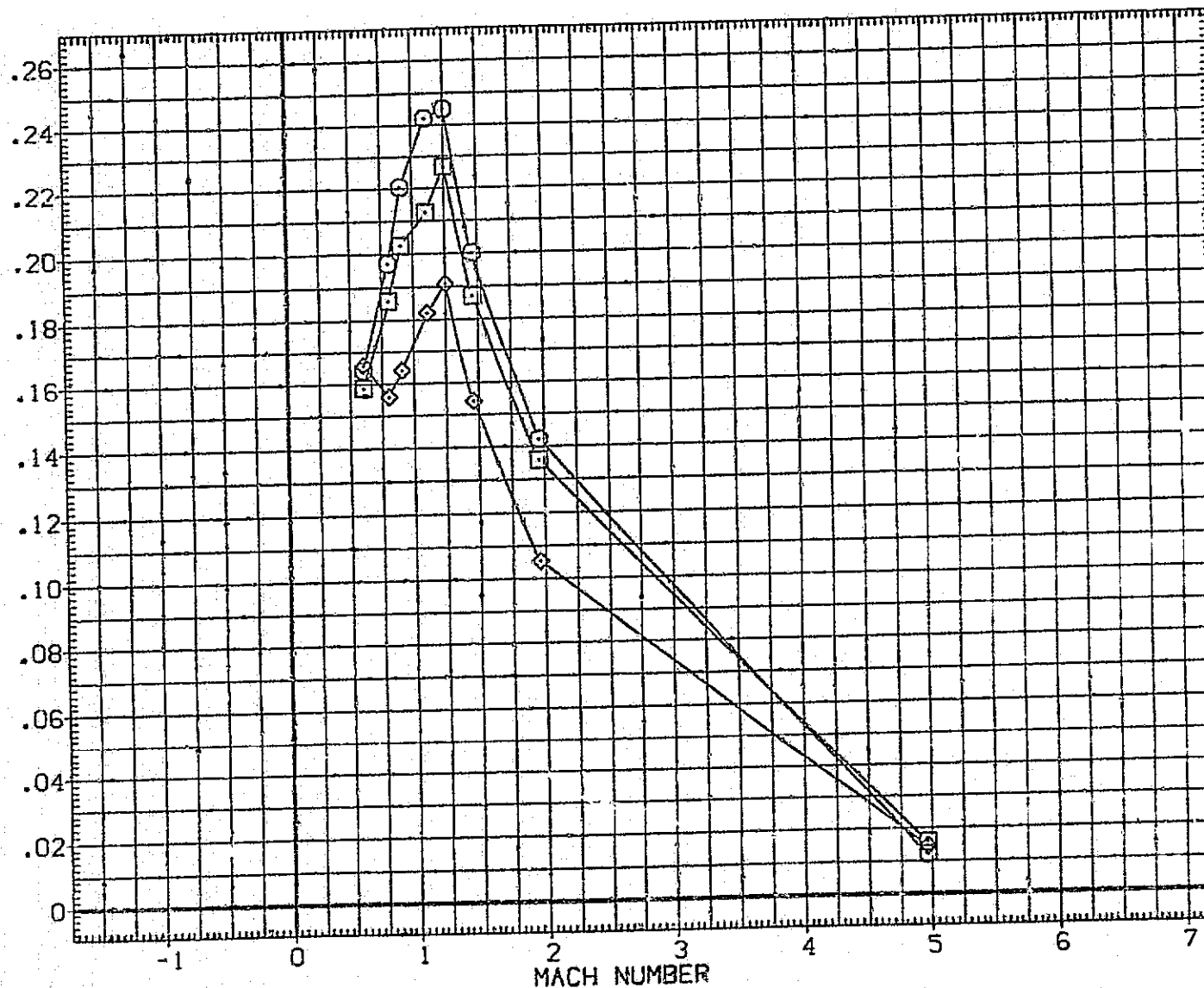


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(A) ALPHA = -10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS.CABT

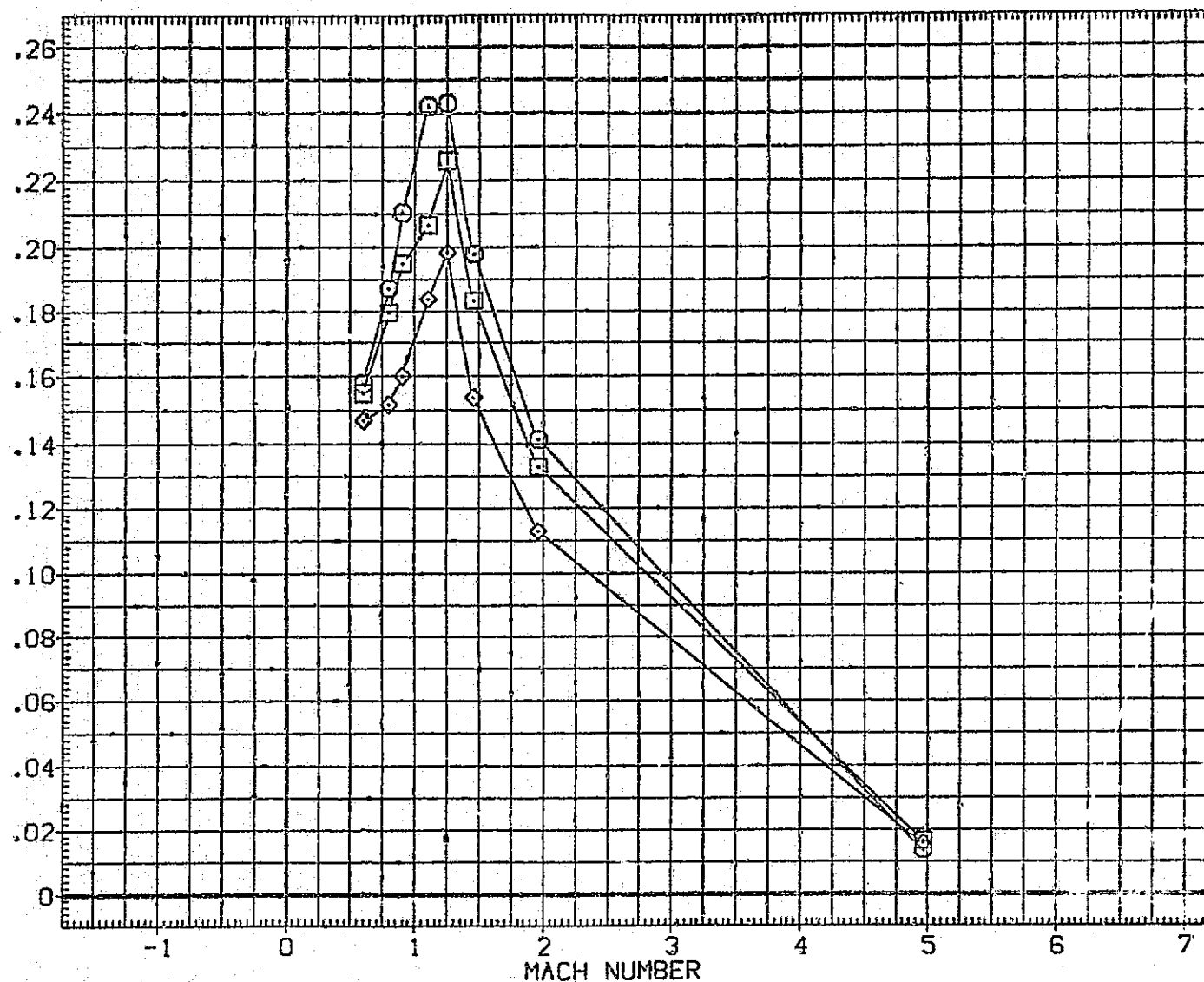


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(B) ALPHA = -8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

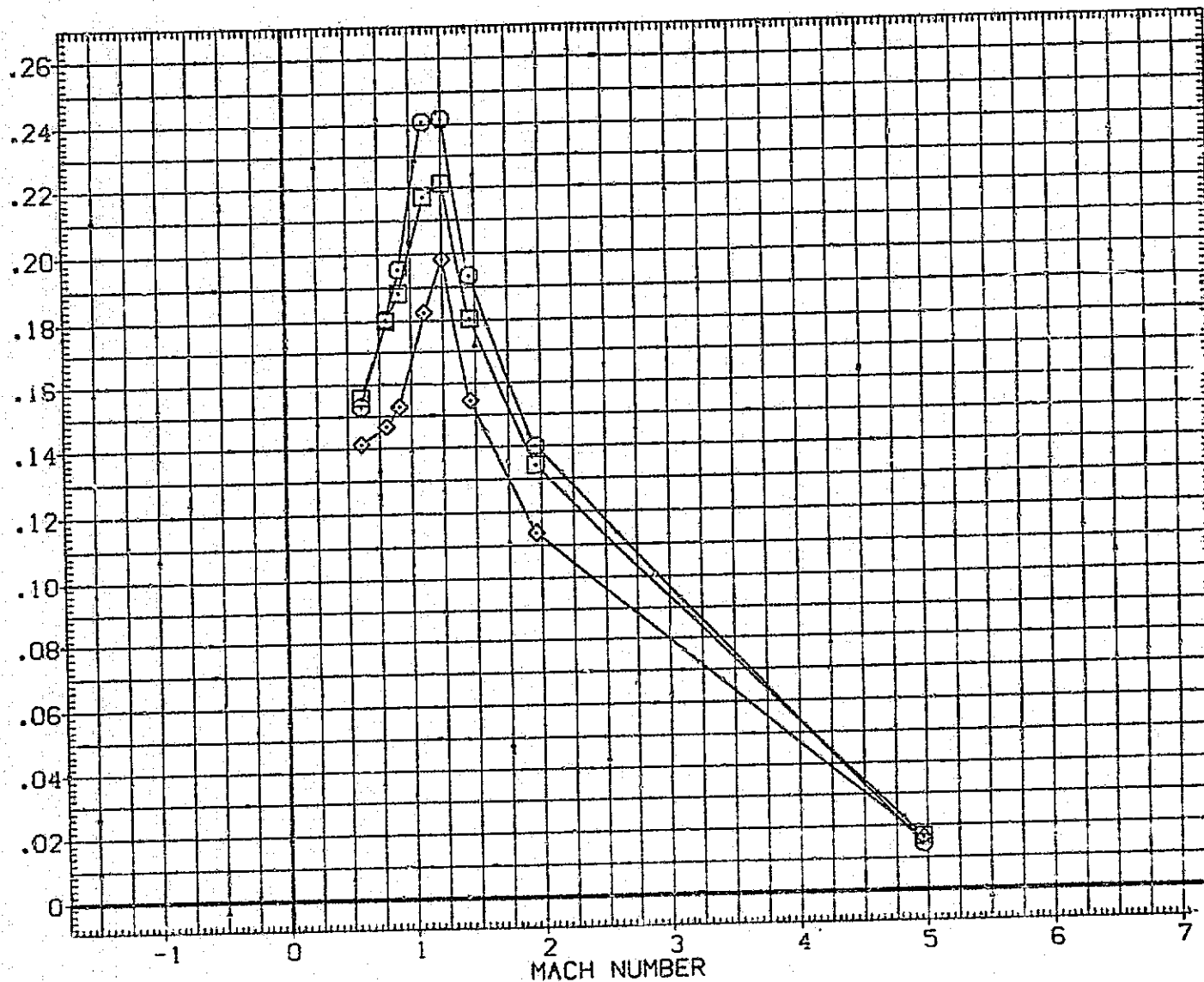


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(C) ALPHA = -6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC S94(1A33) 740TS (TIP1SIP201) ORB STING
(VIC017)	MSFC S94(1A33) 740TS (TIP1SIP201) FORKED STING
(VIC019)	MSFC S94(1A33) 740TS (TIP1SIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
YMRP	976.0000	IN. XT
ZMRP	400.0000	IN. YT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

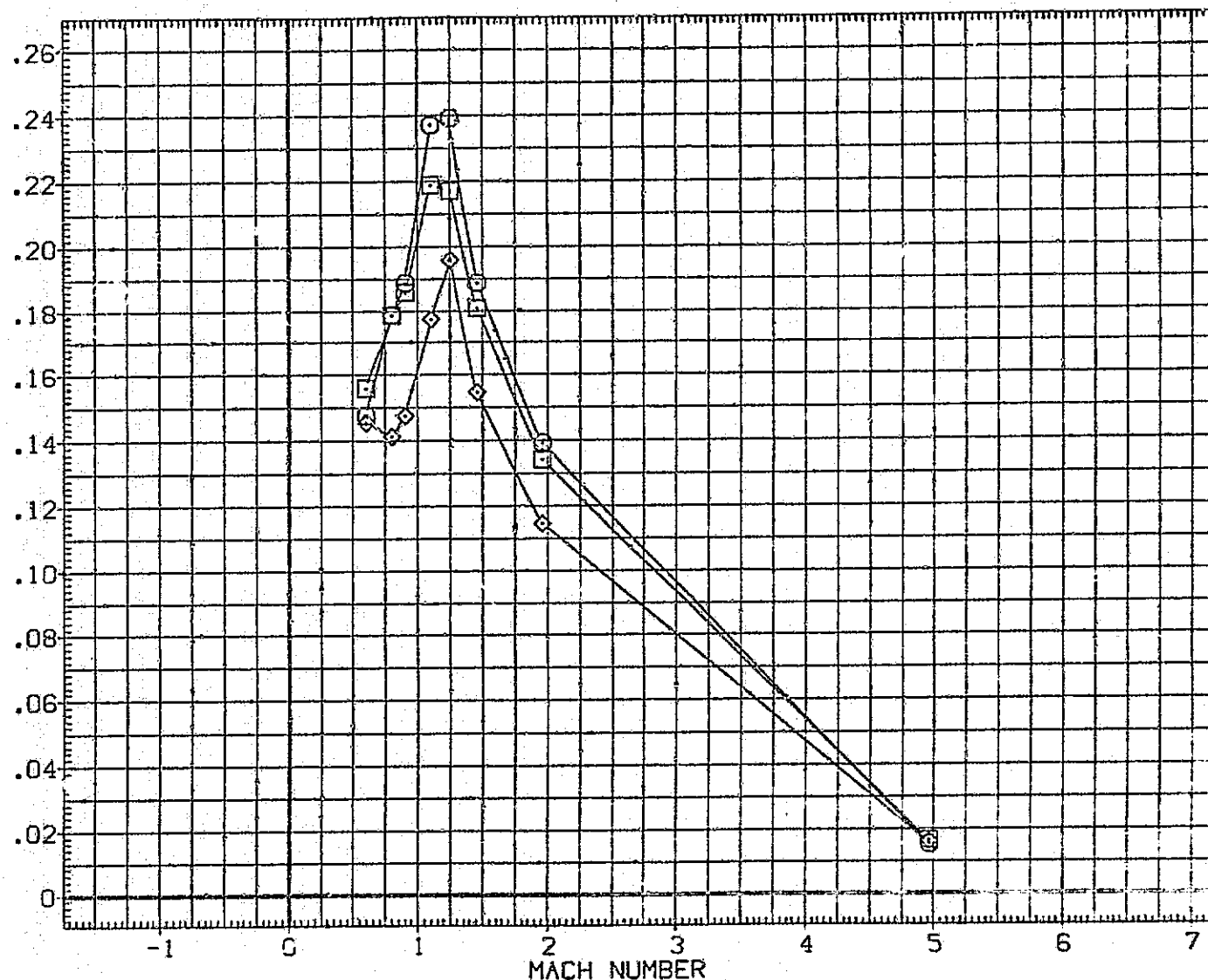


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(D) ALPHA = -4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) ○	MSFC S94(1A33) 740TS (TIPISIP201) ORB STING
(VIC017) □	MSFC S94(1A33) 740TS (TIPISIP201) FORKED STING
(VIC019) ◇	MSFC S94(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

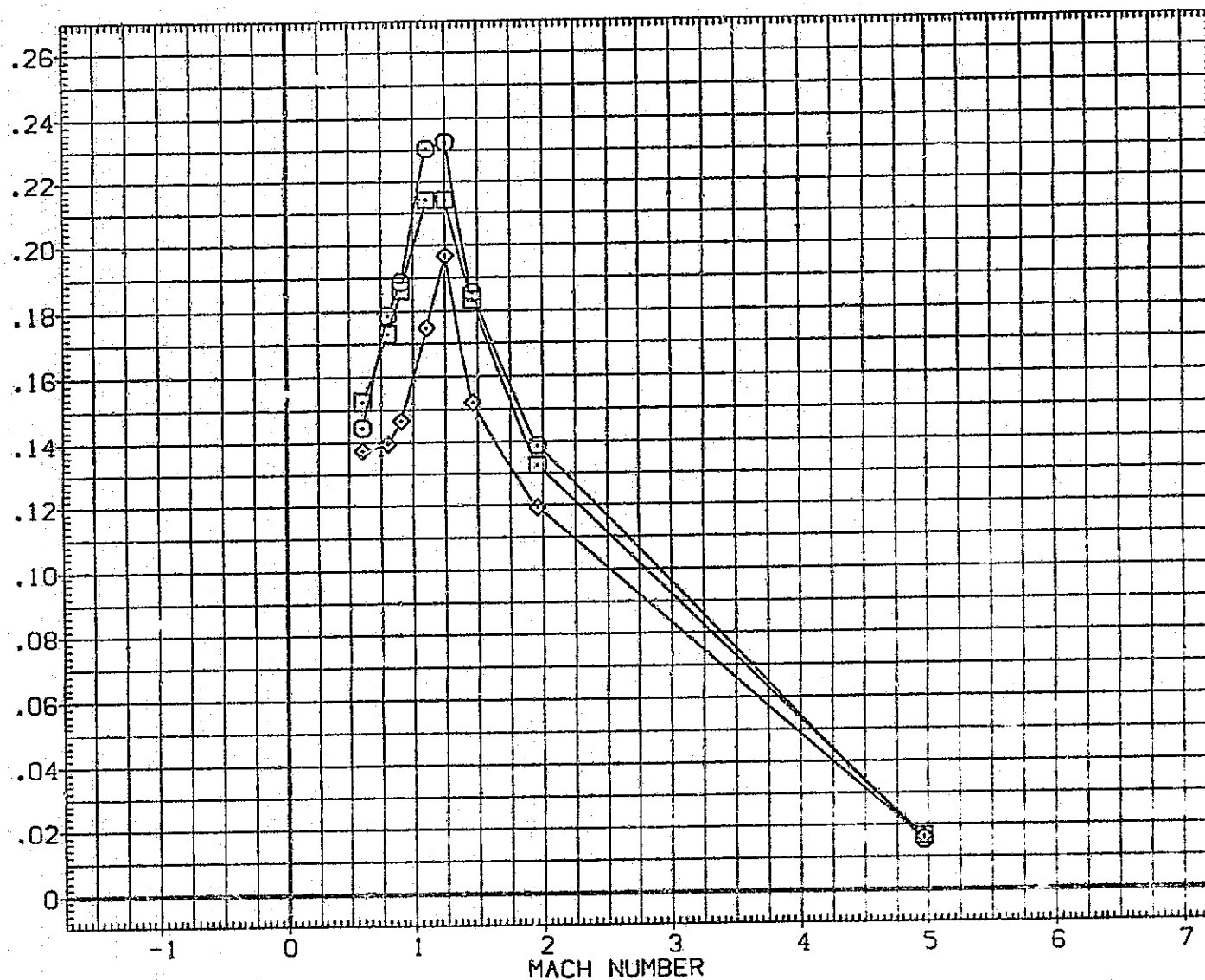


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(E) ALPHA = -2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(1A33) 740TS (TIP1SIP201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIP1SIP201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIP1SIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2620.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

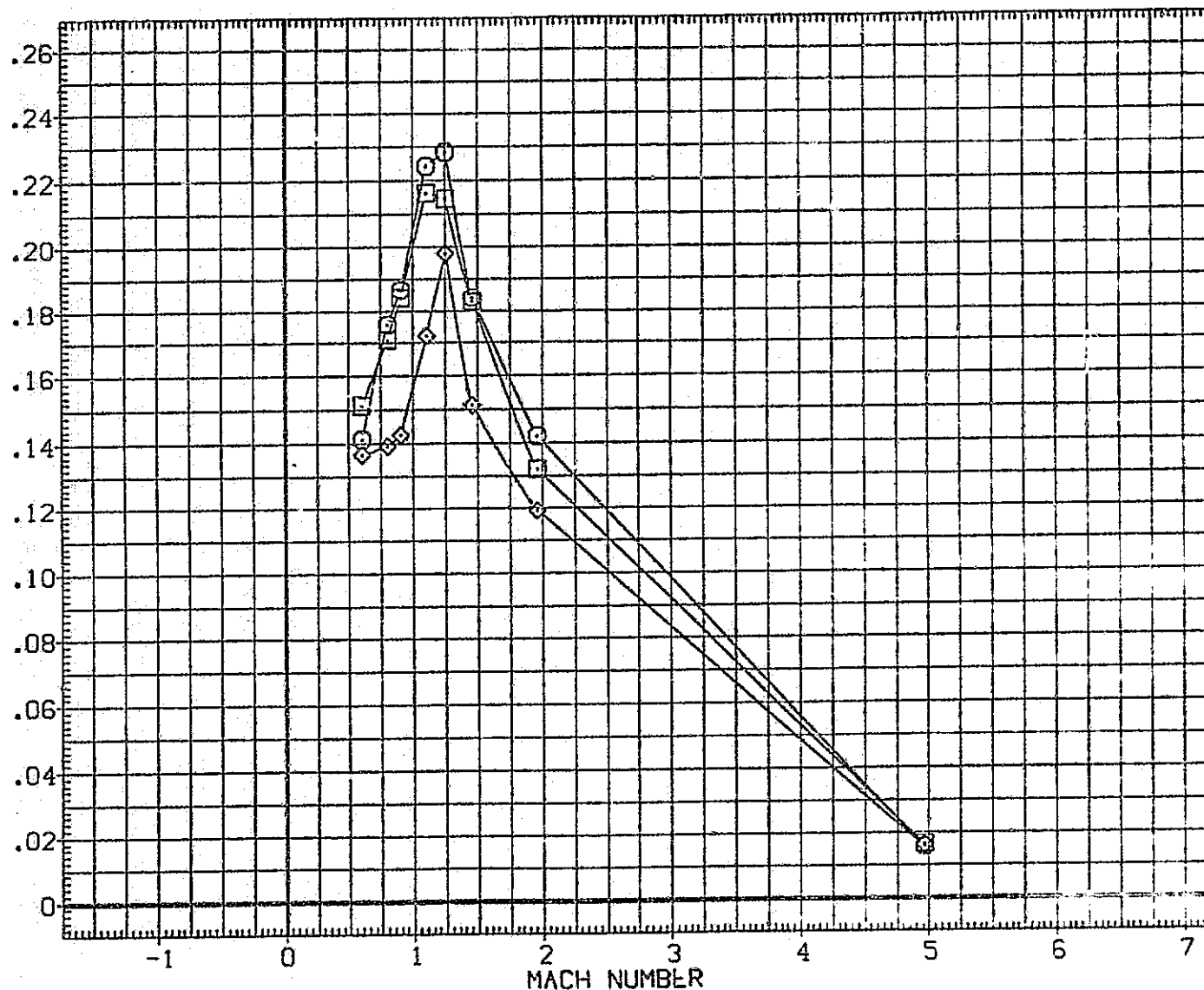


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(F) ALPHA = .00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

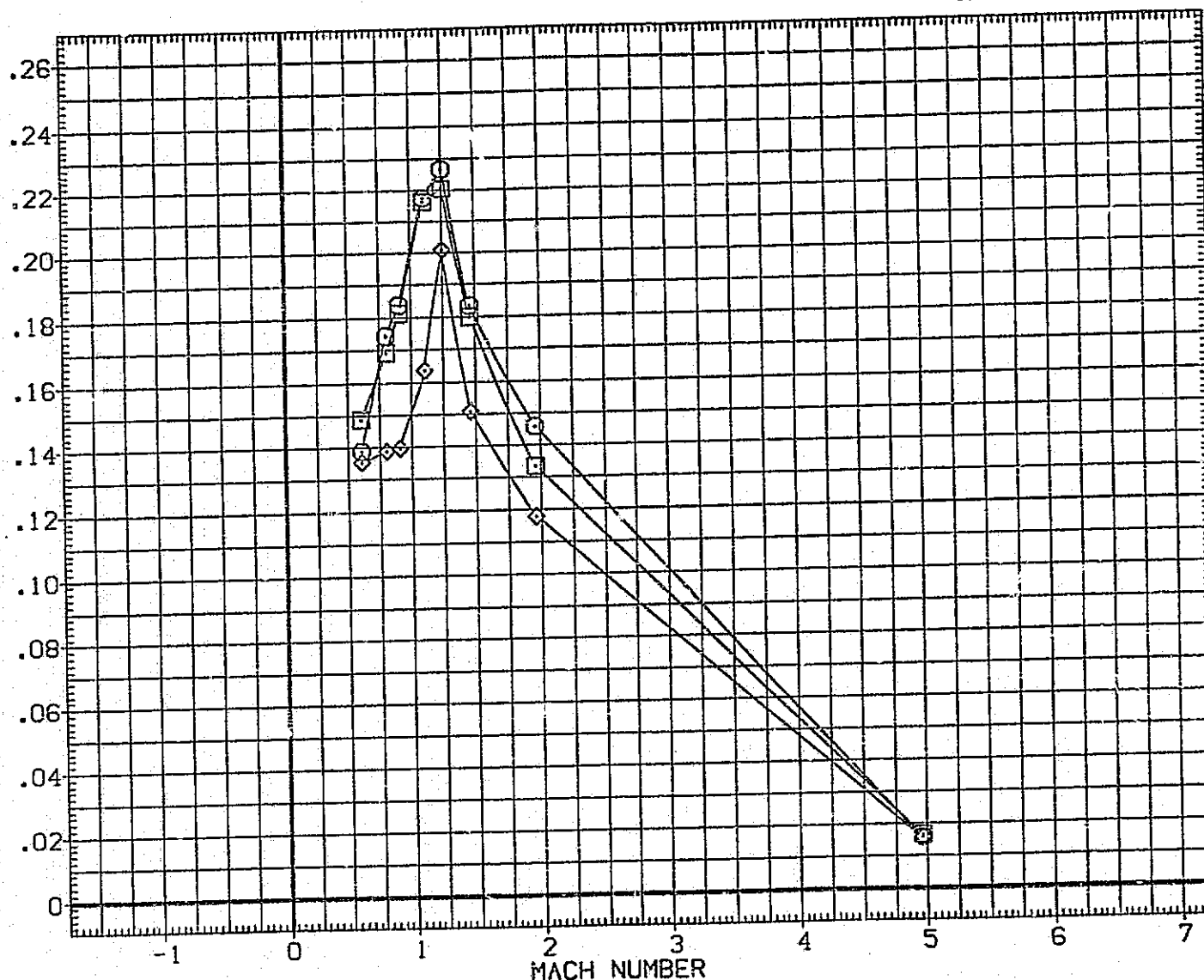


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(G)ALPHA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

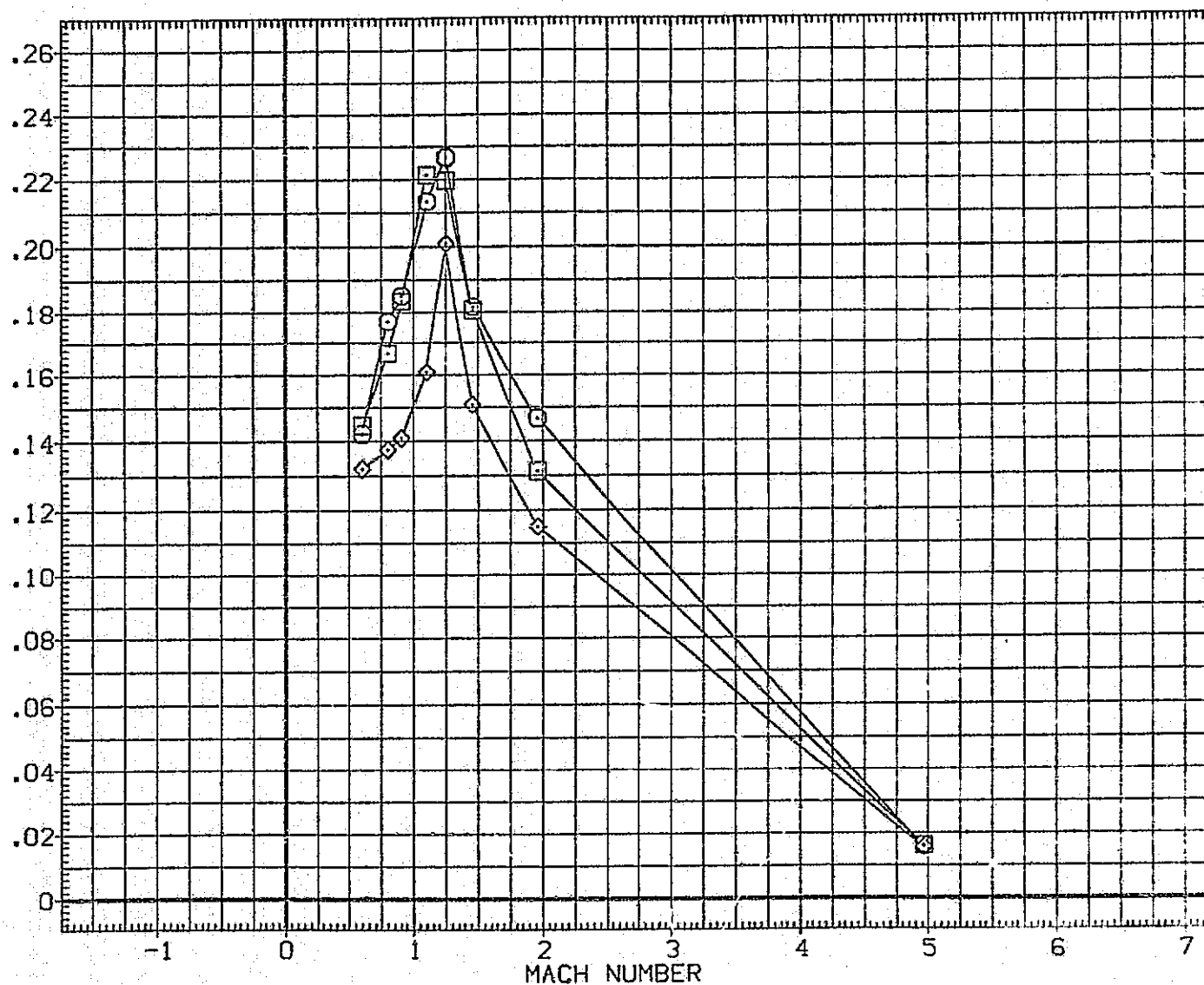


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(H)ALPHA = 4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(1A33) 740TS (TIP1S1P201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIP1S1P201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIP1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

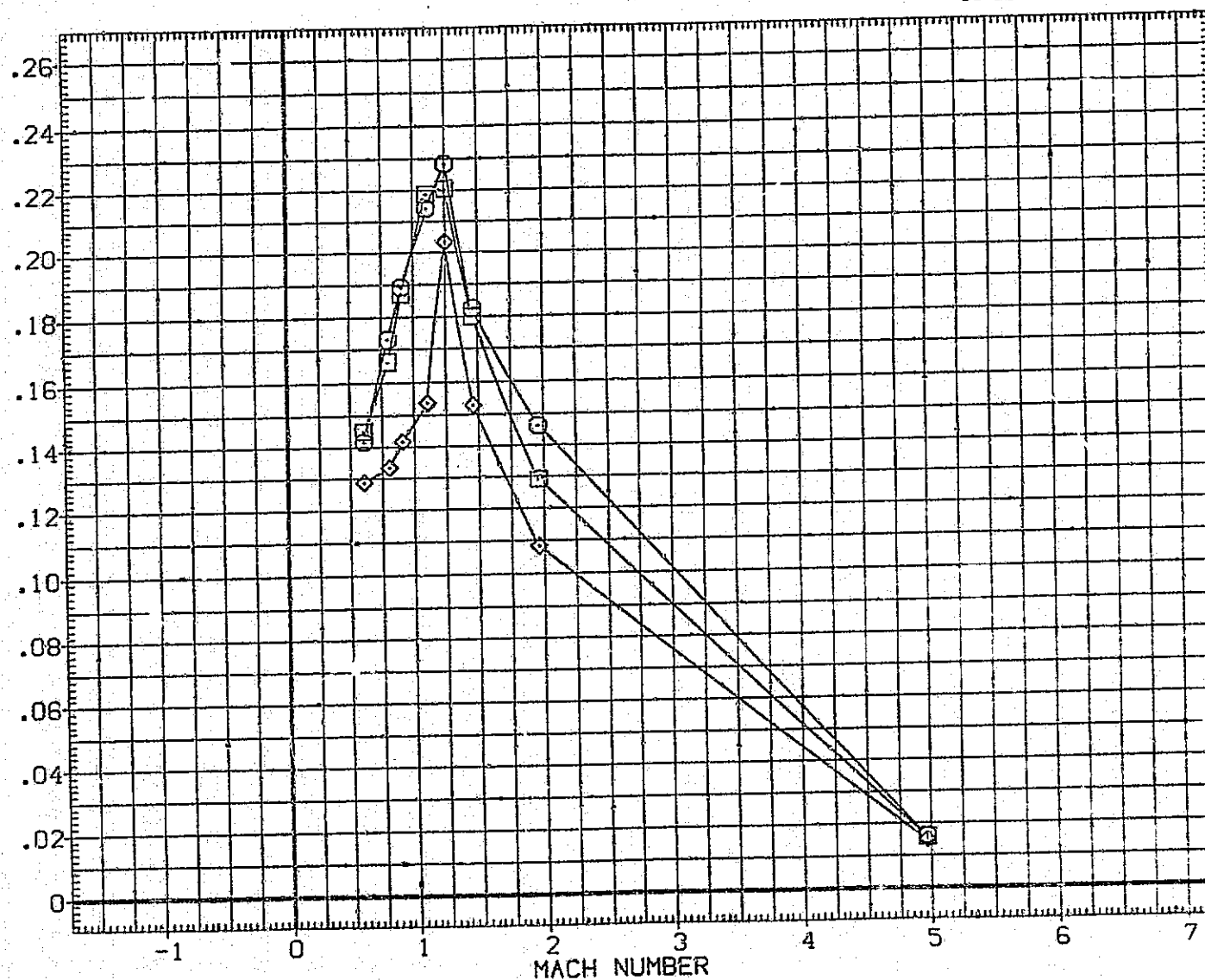


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(1) ALPHA = 6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC S94(IA33) 740TS (TIPISIP201) ORB STING
(VIC017)	MSFC S94(IA33) 740TS (TIPISIP201) FORKED STING
(VIC019)	MSFC S94(IA33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

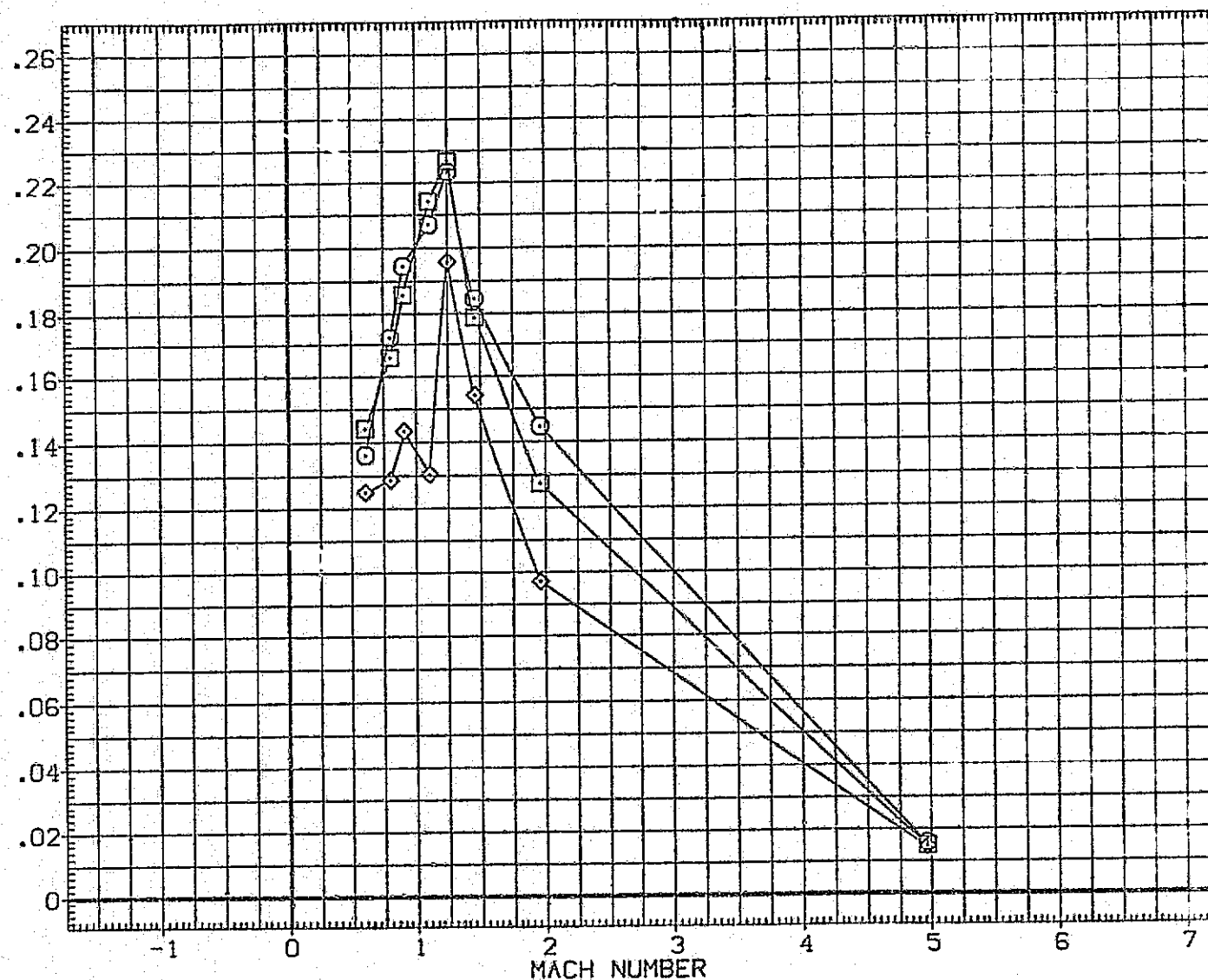


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(J)ALPHA = 8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(WIC007) □	MSFC S94(1A33) 740TS (T1P1S1P201) ORB STING
(WIC017) □	MSFC S94(1A33) 740TS (T1P1S1P201) FORKED STING
(VIC019) ◇	MSFC S94(1A33) 740TS (T1P1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

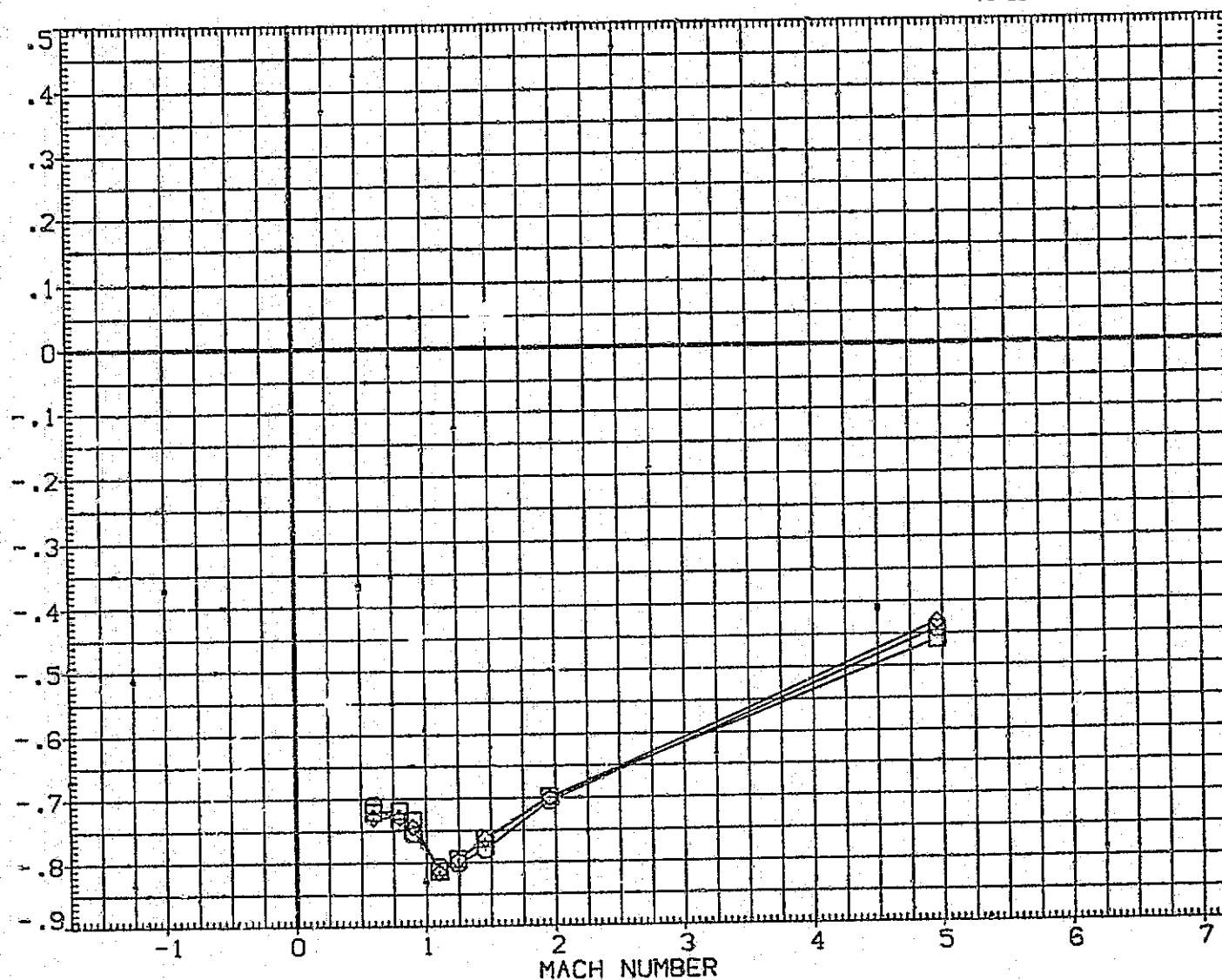


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(A) ALPHA = -10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(WIC007)	MSFC 594(1A33) 740TS (TIP1S1P201) ORB STING
(WIC017)	MSFC 594(1A33) 740TS (TIP1S1P201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIP1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

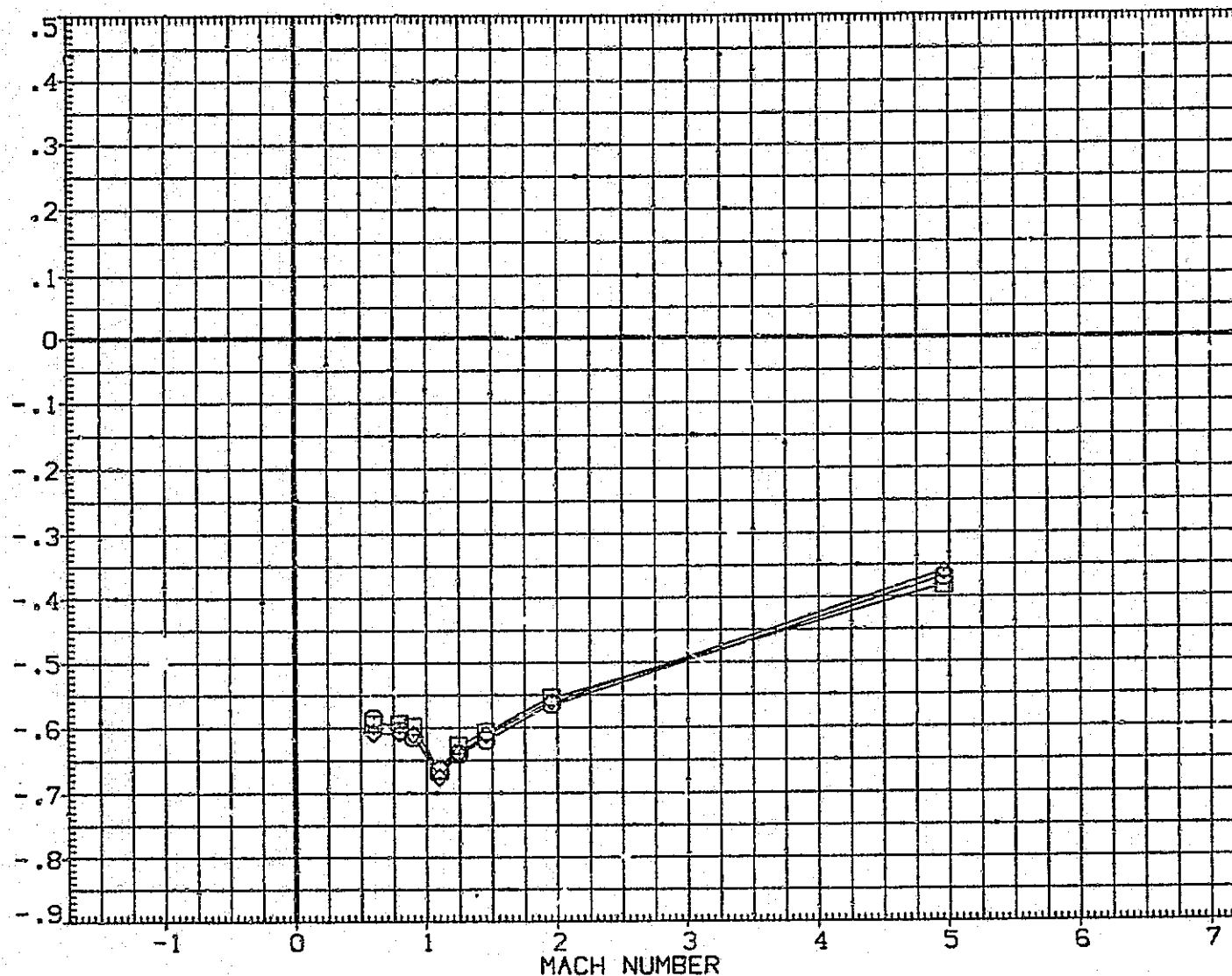


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(B) ALPHA = -8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(WIC007)	MSFC 594(1A33) 740TS (TIP1S1P201) ORB STING
(WIC017)	MSFC 594(1A33) 740TS (TIP1S1P201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIP1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

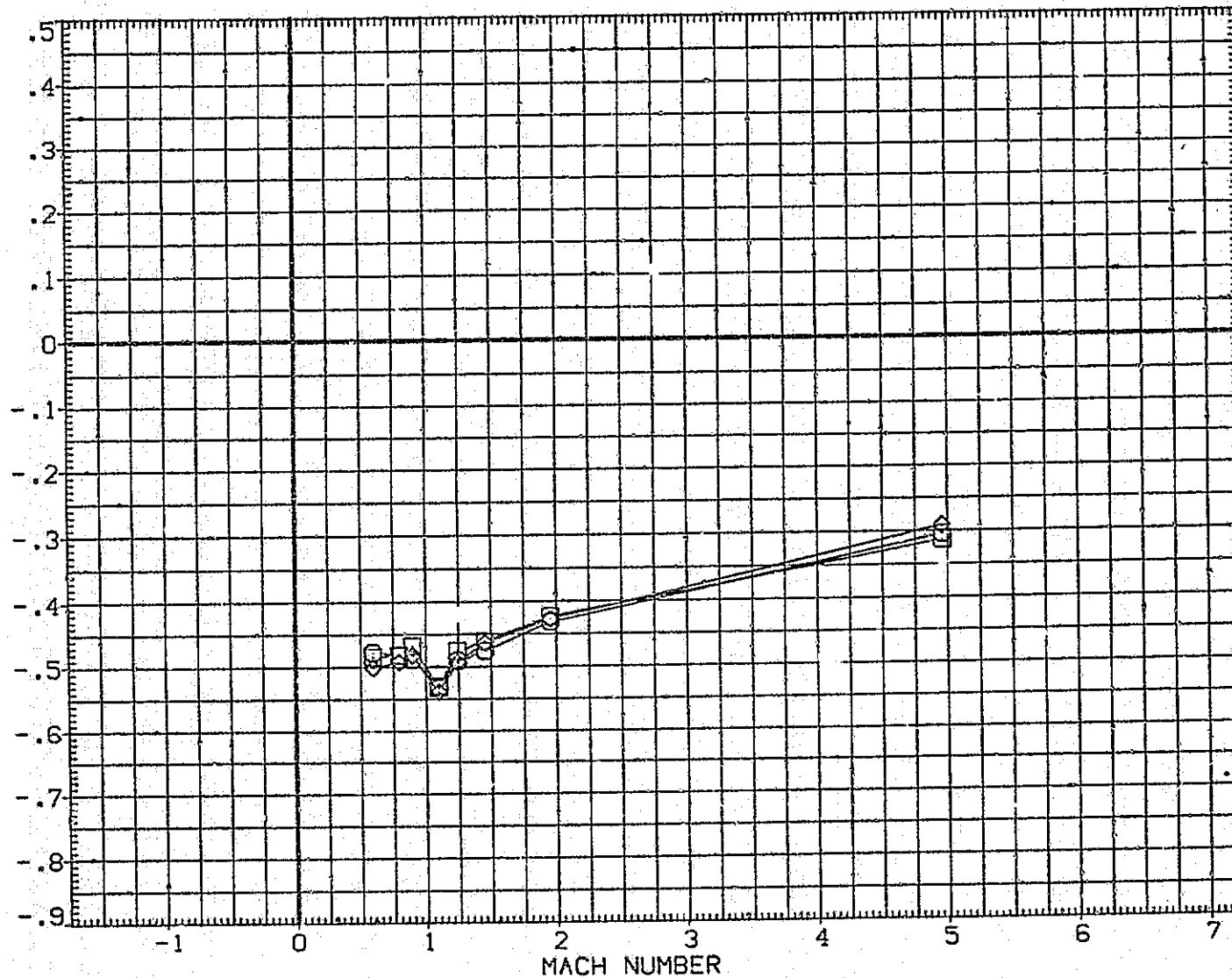


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(C) ALPHA = -6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(A33) 740TS (T1P1S1P201) ORB STING
(VIC017)	MSFC 594(A33) 740TS (T1P1S1P201) FORKED STING
(VIC019)	MSFC 594(A33) 740TS (T1P1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

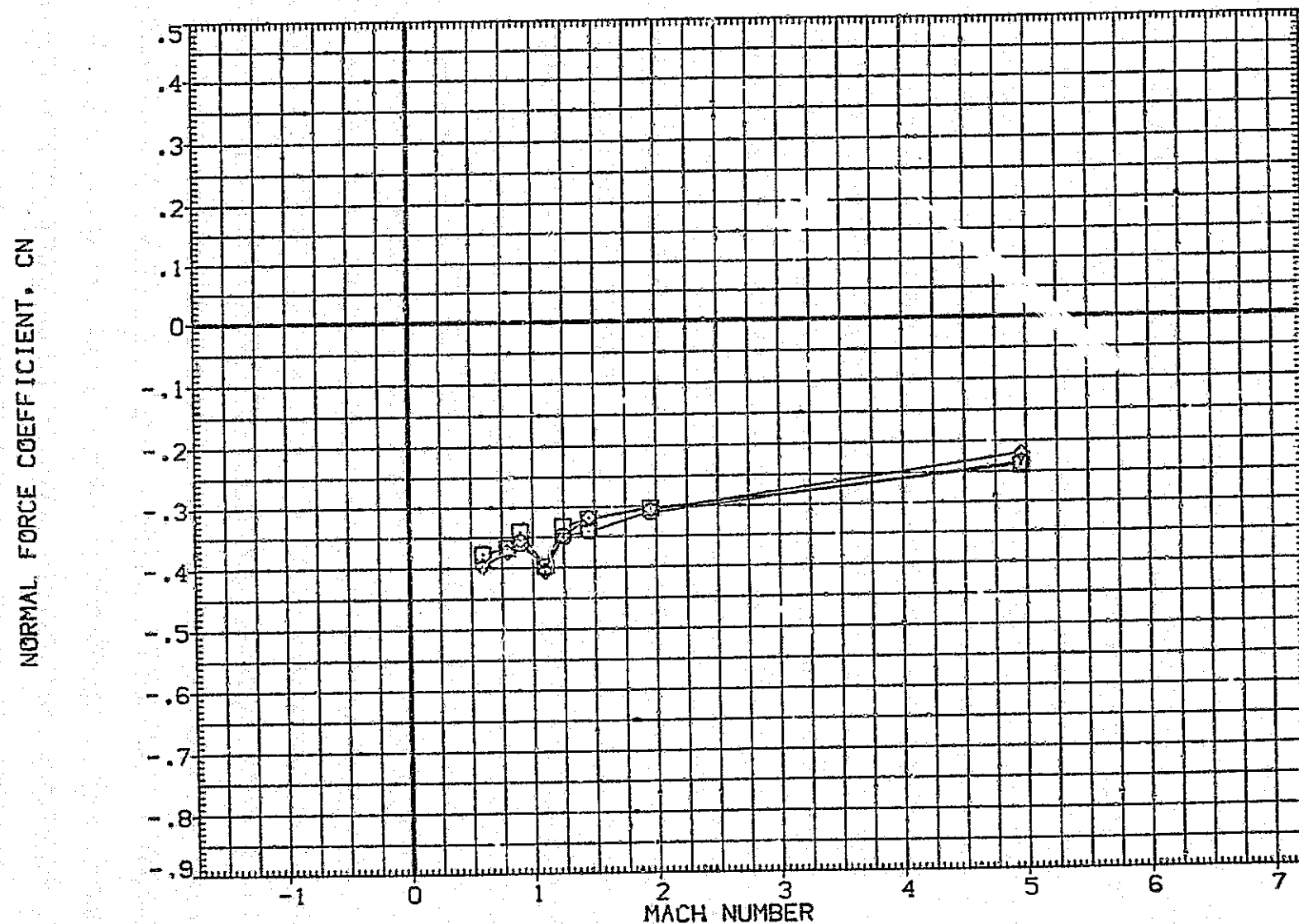


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
 (D) ALPHA = -4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(IA33) 740TS (TIP1SIP201) ORB STING
(VIC017)	MSFC 594(IA33) 740TS (TIP1SIP201) FORKED STING
(VIC019)	MSFC 594(IA33) 740TS (TIP1SIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

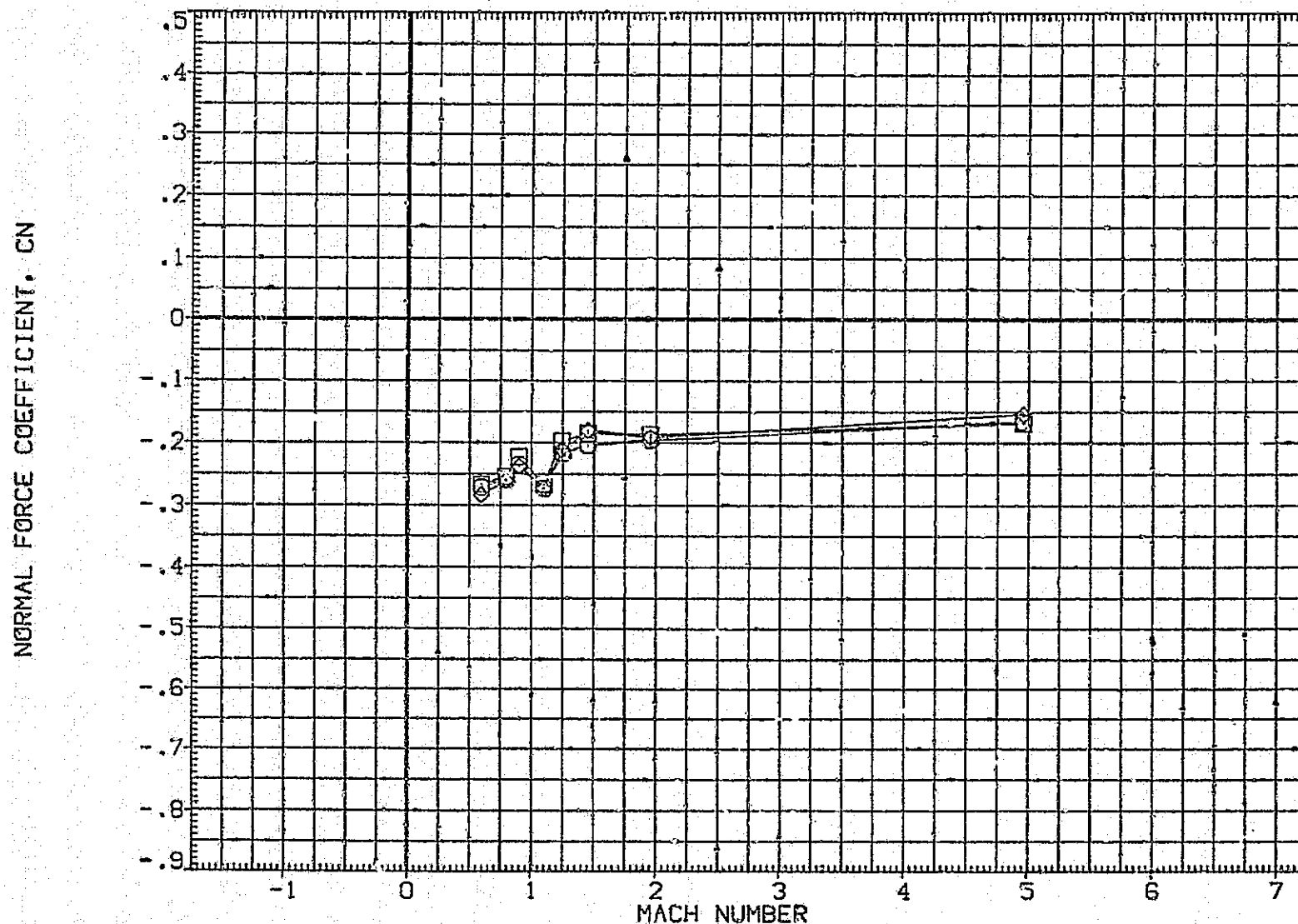


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(E) ALPHA = -2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (TIP1S1P201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIP1S1P201)	FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIP1S1P201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

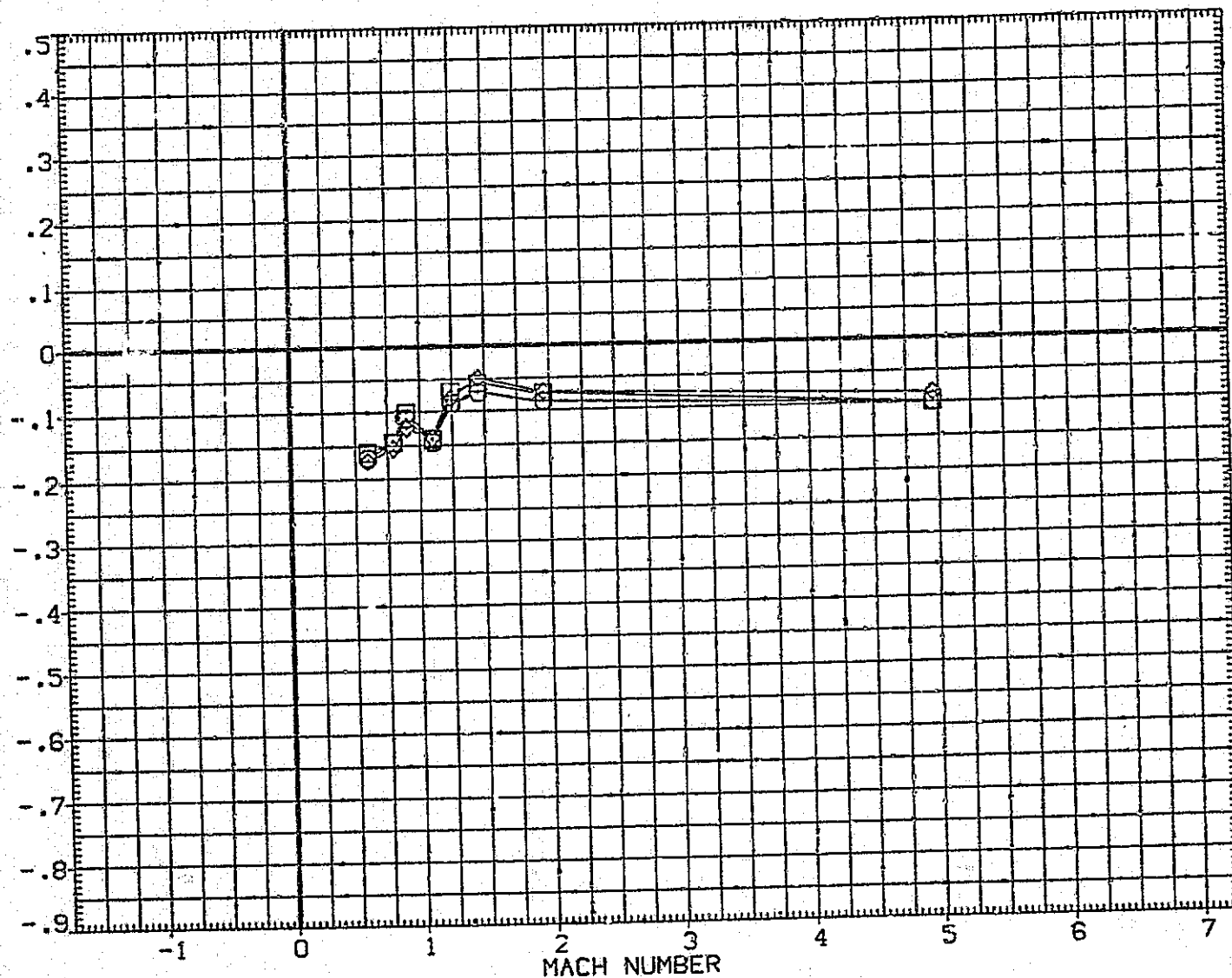





FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(F) ALPHA = .00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(V1C007) 	MSFC 594(1A33) 74CTS (T1P1S1P2D1) ORB STING
(V1C017) 	MSFC 594(1A33) 74DTS (T1P1S1P2D1) FORKED STING
(V1C019) 	MSFC 594(1A33) 74DTS (T1P1S1P2D1) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

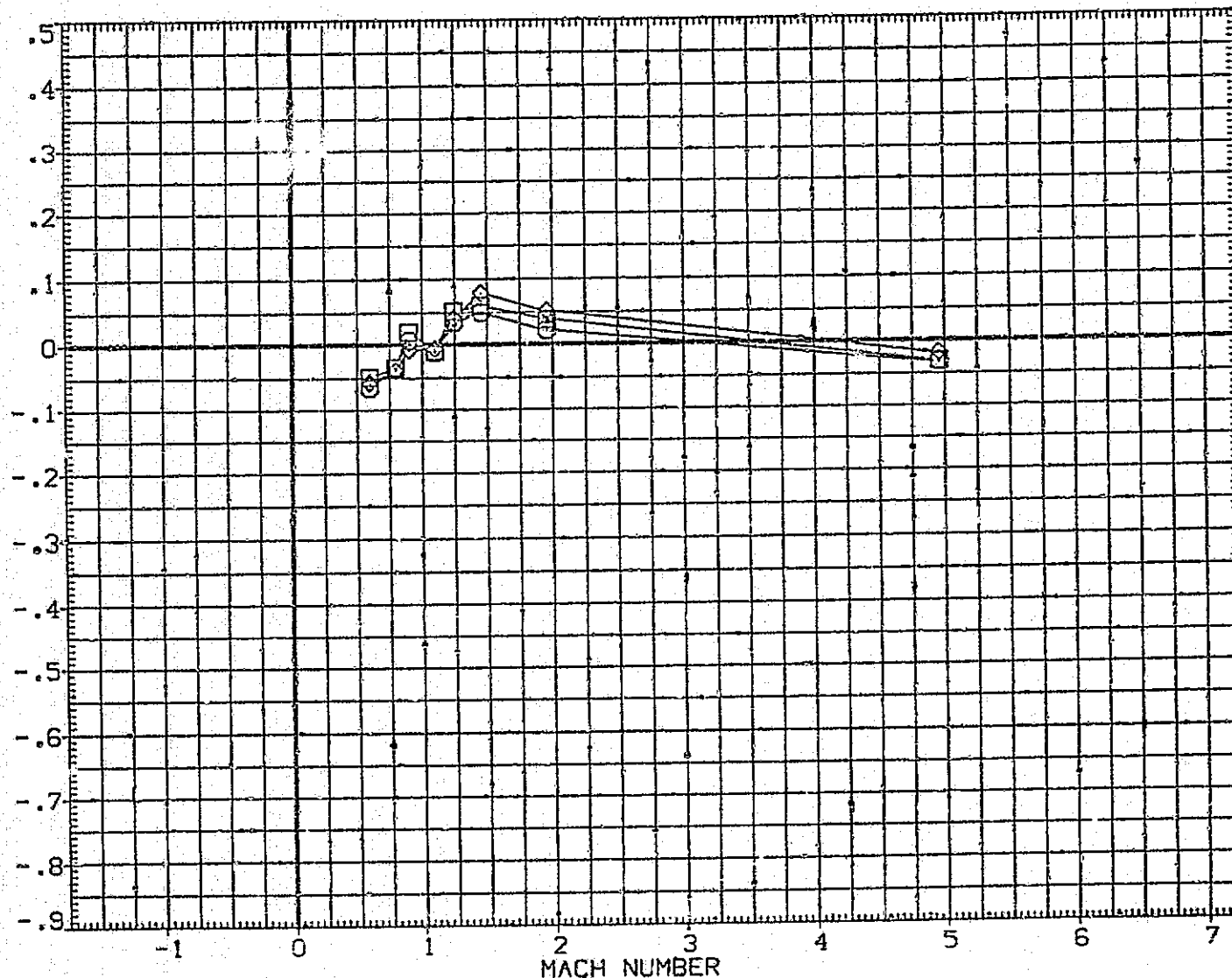


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(G) ALPHA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) ○	MSFC 594(1A33) 740TS (TIP1S1P201) ORB STING
(VIC017) □	MSFC 594(1A33) 740TS (TIP1S1P201) FORKED STING
(VIC019) ◇	MSFC 594(1A33) 740TS (TIP1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2680.0000	SO. FT
LREF	1290.0000	7N.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	100.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

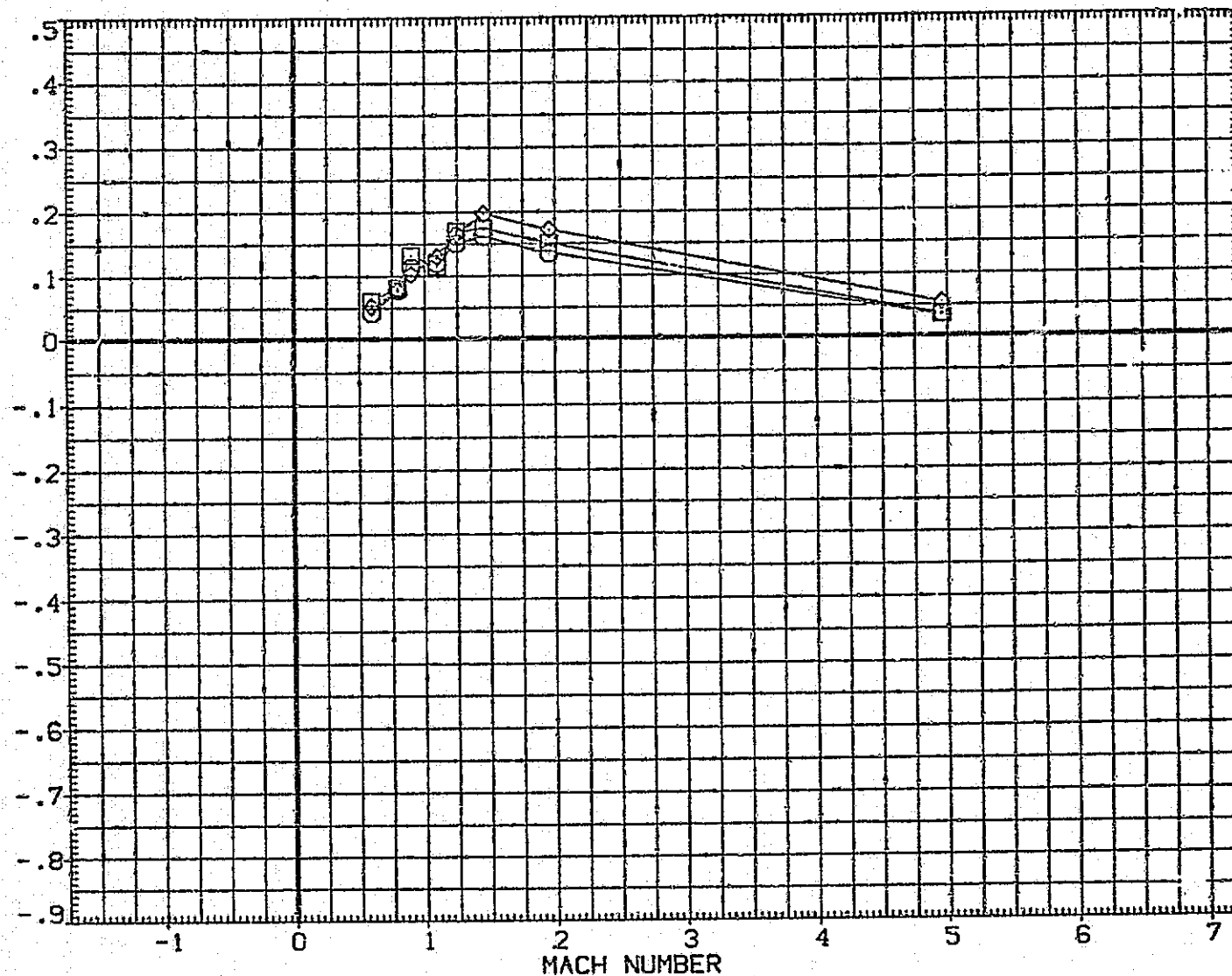


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(H) ALPHA = 4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(WIC007)	MSFC S94(1A33) 740TS (TIP1S1P201)	ORB STING
(WIC017)	MSFC S94(1A33) 740TS (TIP1S1P201)	FORKED STING
(WIC019)	MSFC S94(1A33) 740TS (TIP1S1P201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. YT
SCALE	.0040	

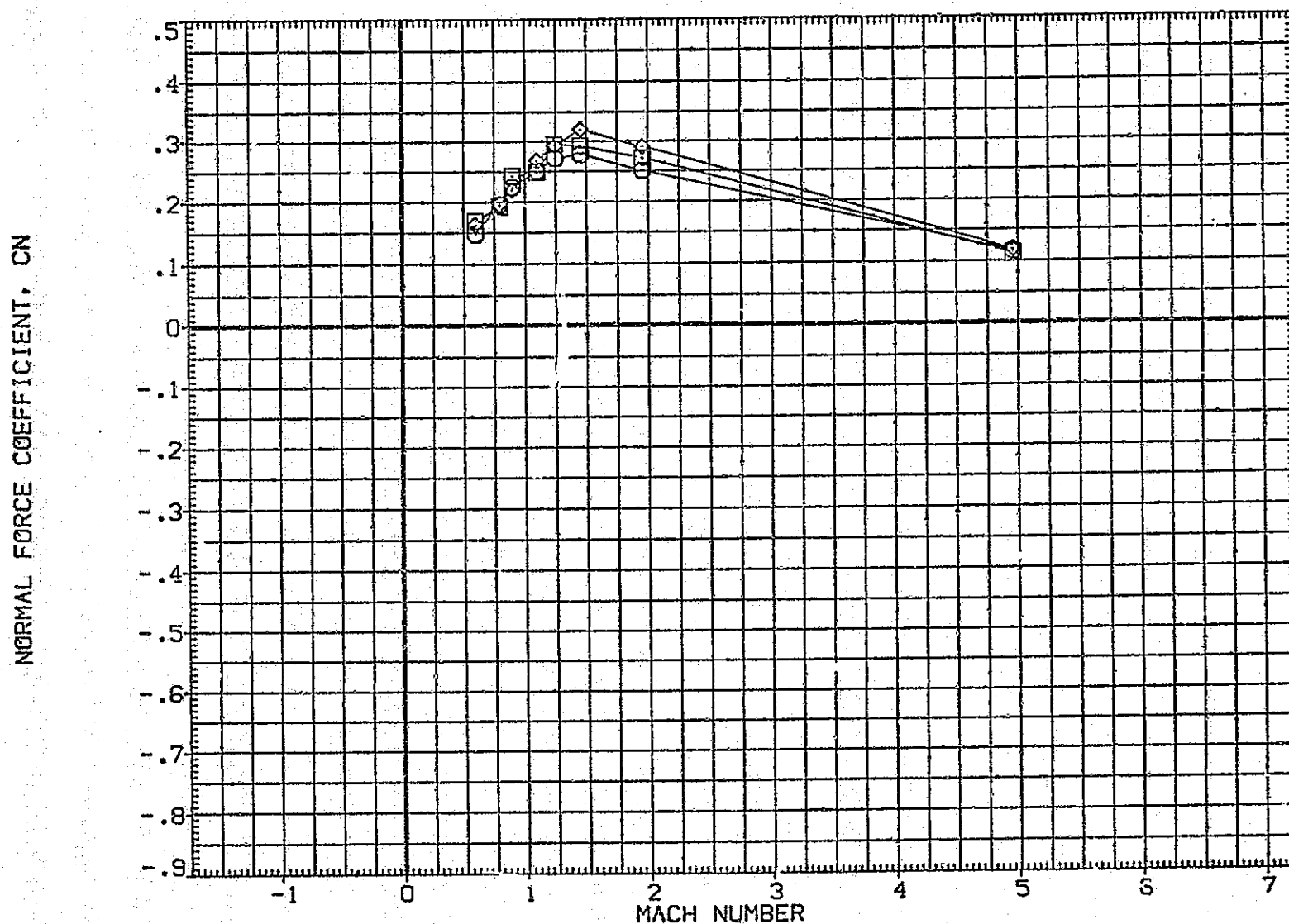


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(1) ALPHA = 6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING
(VIC017)	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
YMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

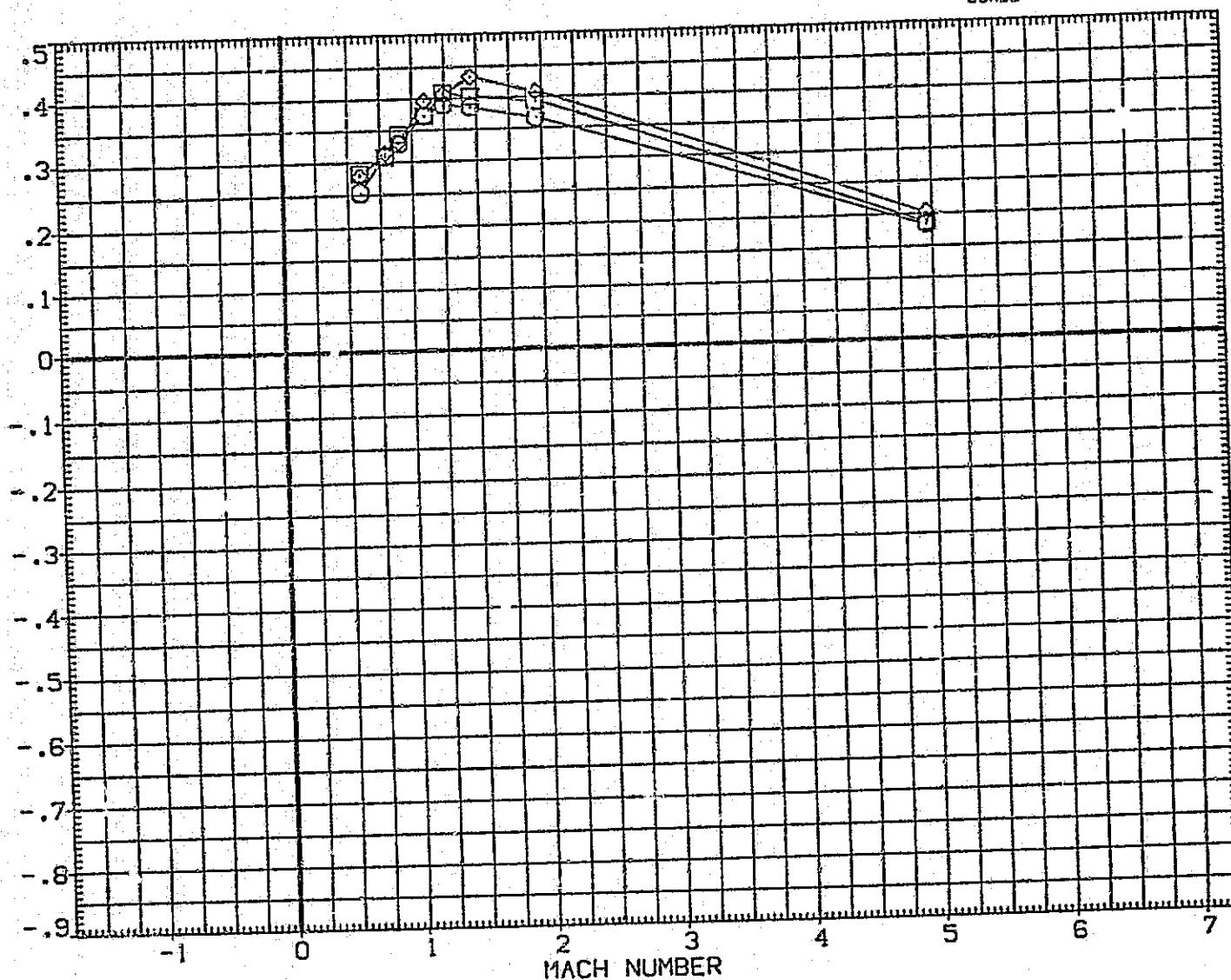


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(J)ALPHA = 8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(WIC007)	MSFC S94(1A33) 740TS (T1P1S1P201) ORB STING
(WIC017)	MSFC S94(1A33) 740TS (T1P1S1P201) FORKED STING
(WIC019)	MSFC S94(1A33) 740TS (T1P1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0640	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

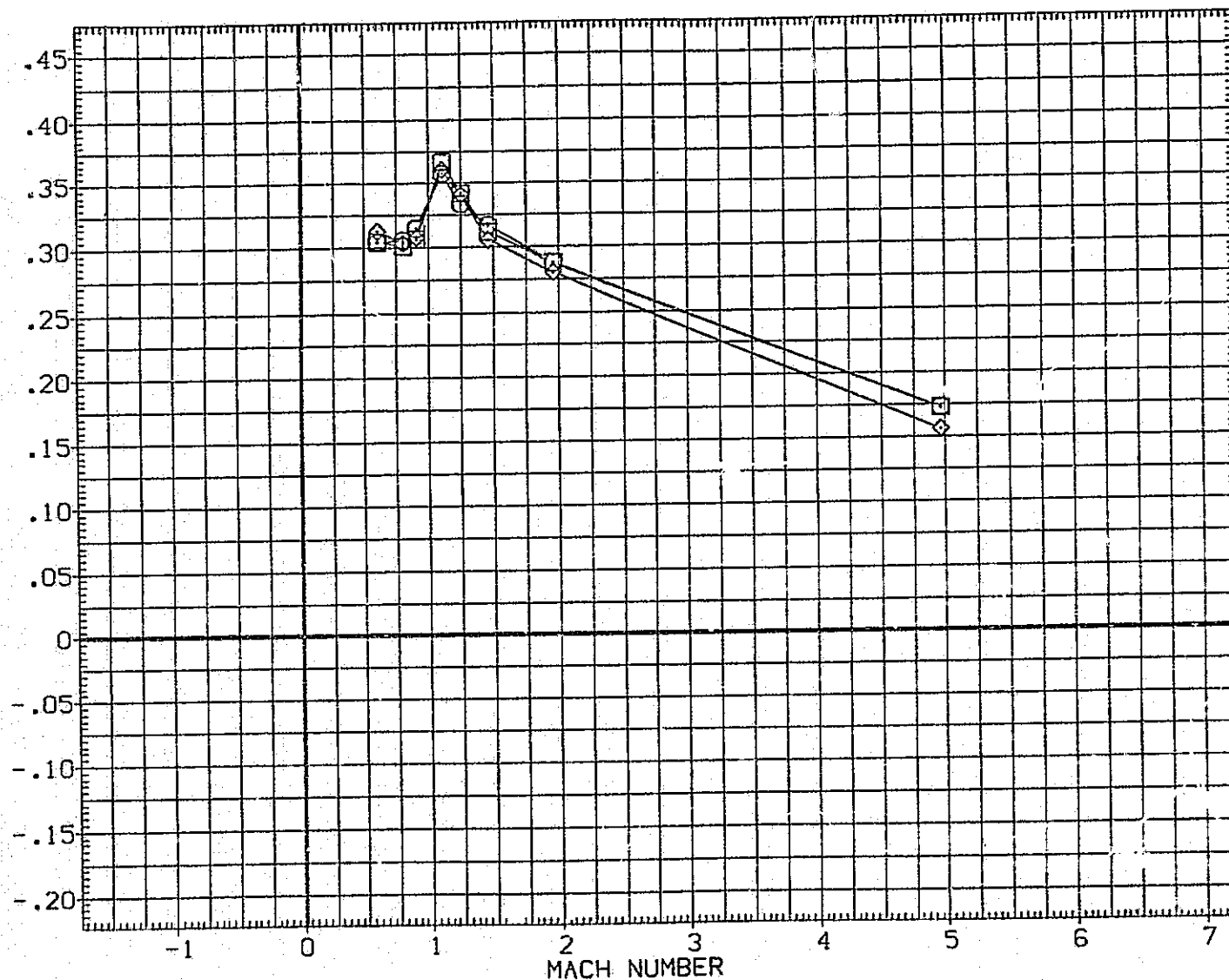


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(A) ALPHA = -10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

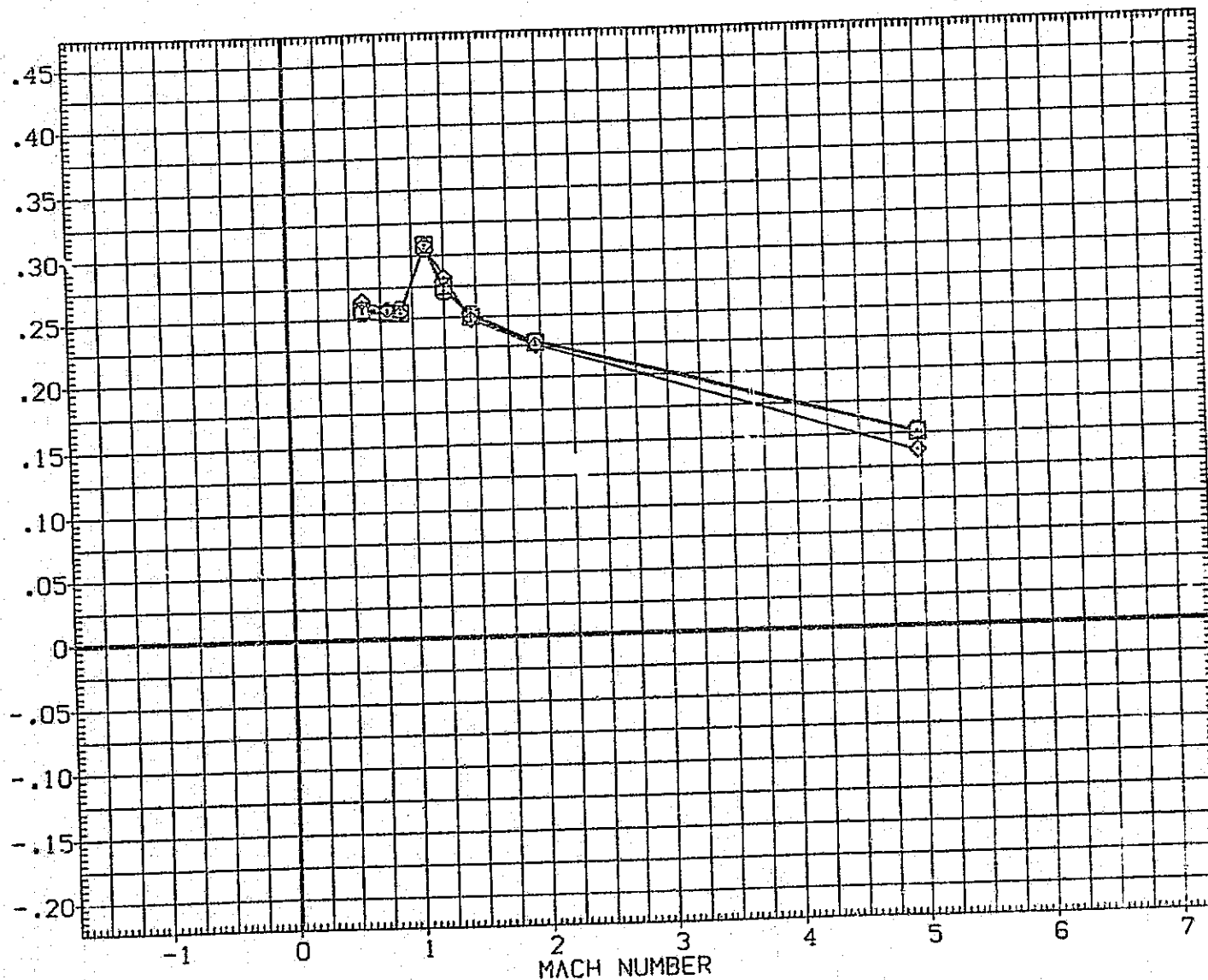


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(B) ALPHA = -8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIG STING
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORIG STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

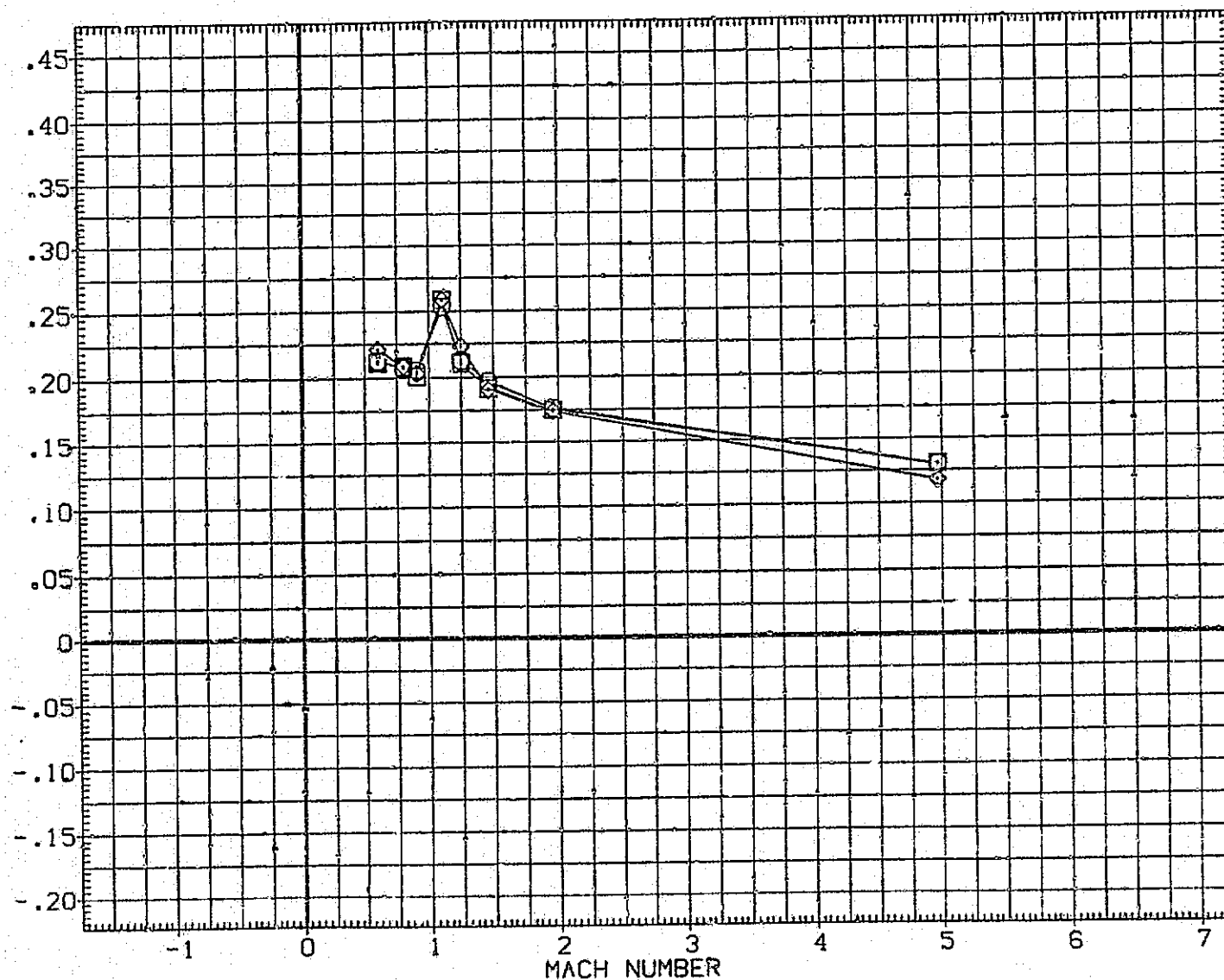


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(C) ALPHA = -6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORBIT STING
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VIC017)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(VIC019)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

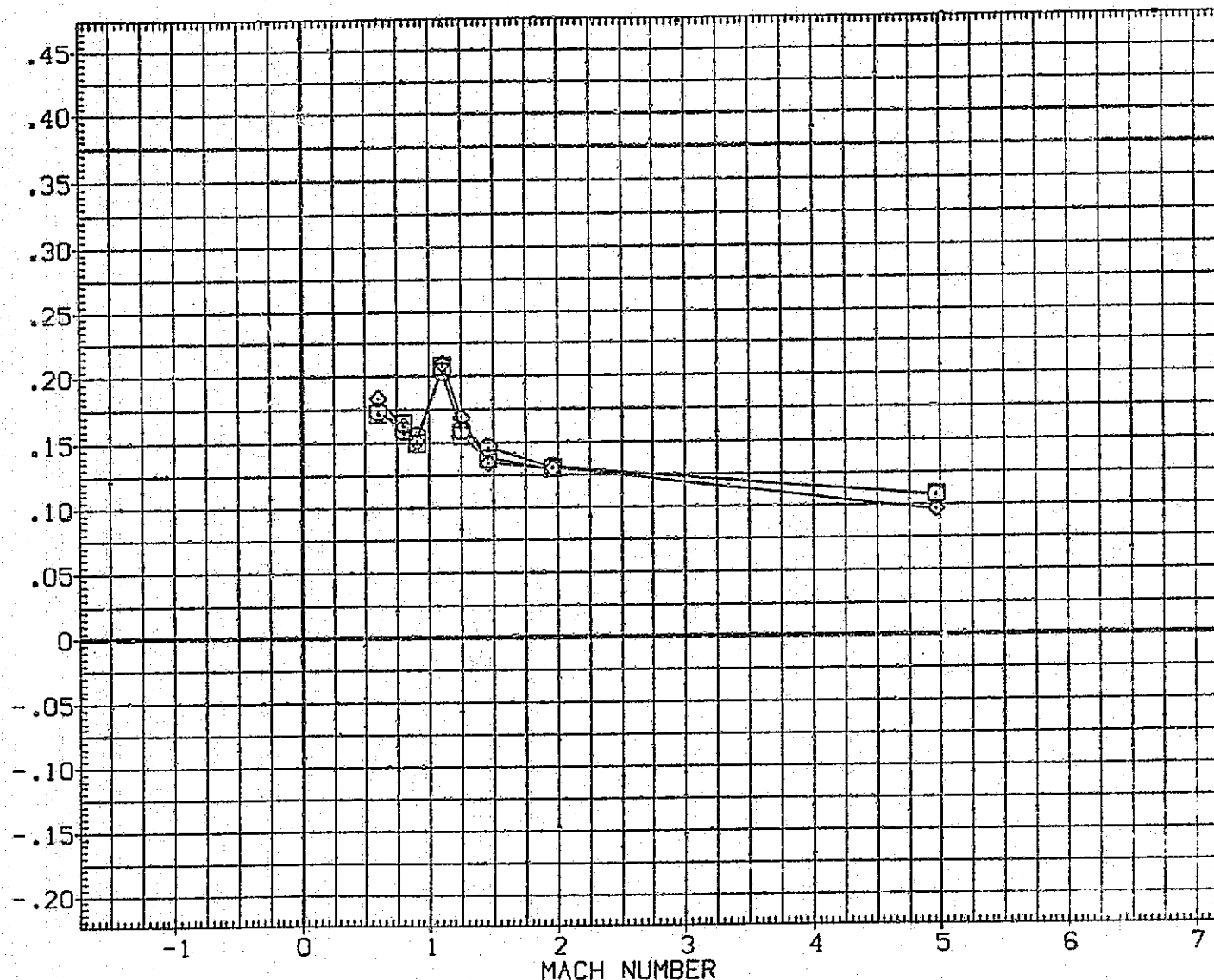


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(D) ALPHA = -4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
{VIC007}	MSFC 594(1A33) 740TS (TIP)SIP201 ORB STING
{VIC017}	MSFC 594(1A33) 740TS (TIP)SIP201 FORKED STING
{VIC019}	MSFC 594(1A33) 740TS (TIP)SIP201 FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1250.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

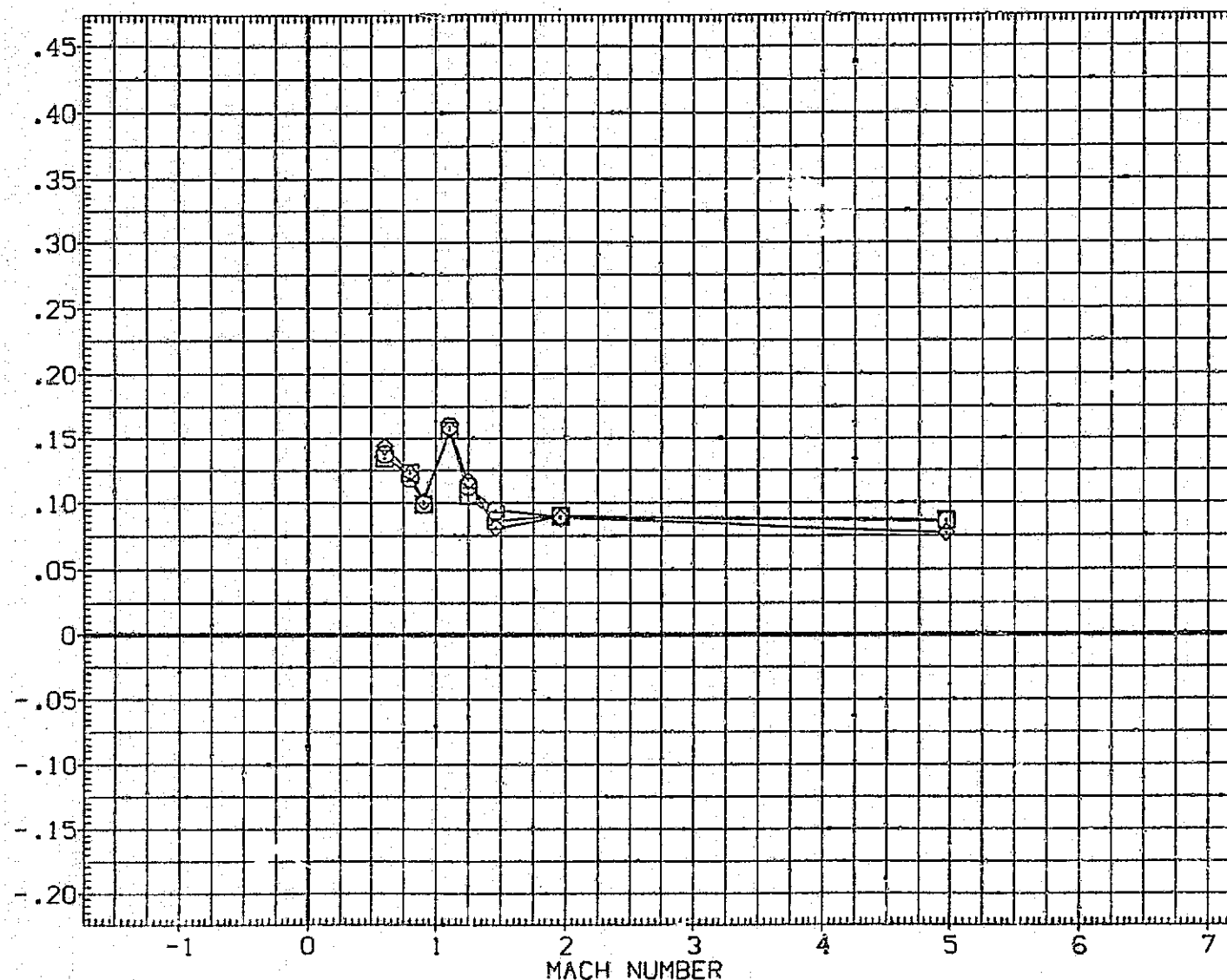


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(E) ALPHA = -2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC007)	MSFC S94(1A33) 740TS (TIP1S1P201)	ORB STING
(VIC017)	MSFC S94(1A33) 740TS (TIP1S1P201)	FORKED STING
(VIC019)	MSFC S94(1A33) 740TS (TIP1S1P201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
YMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

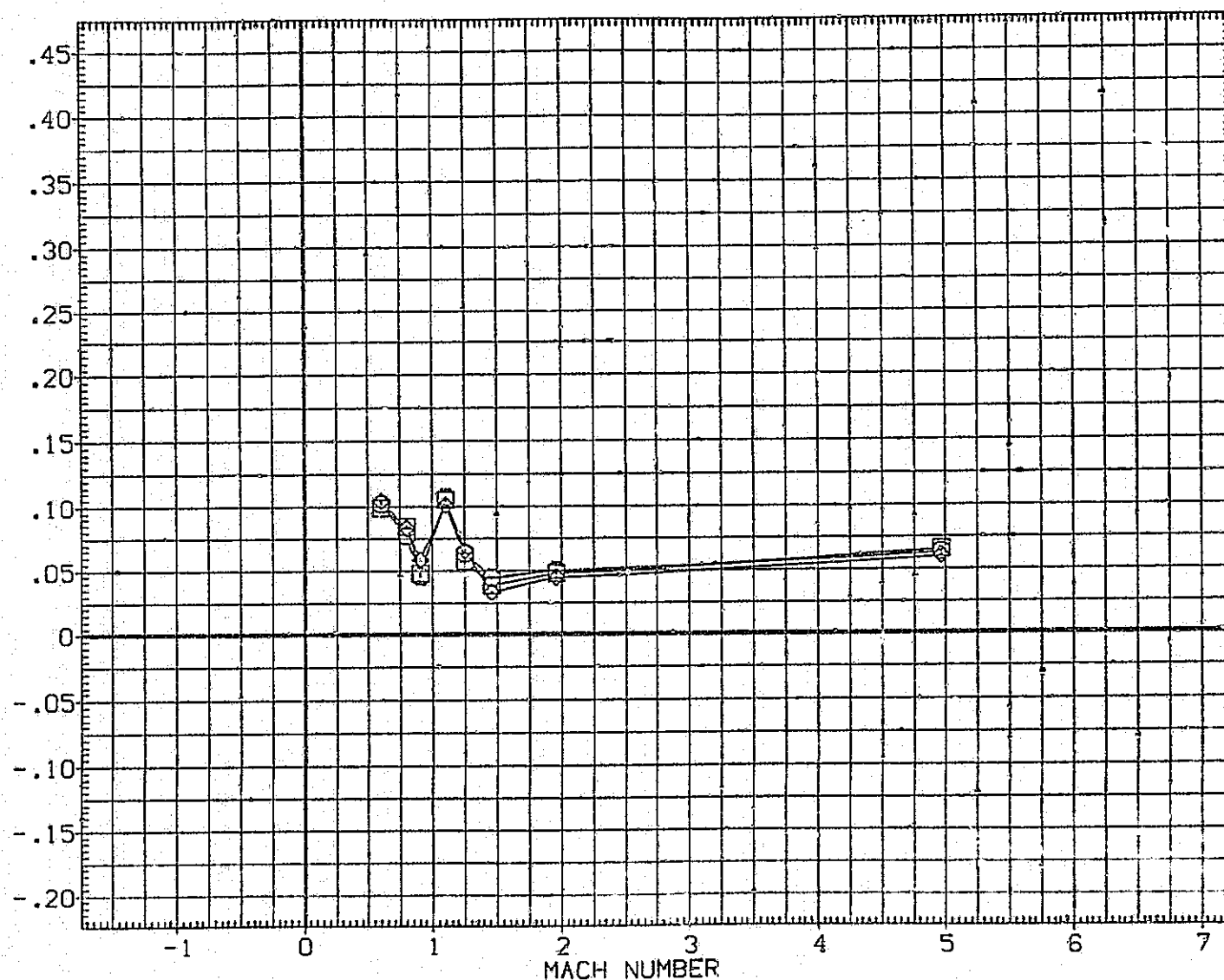





FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(F) ALPHA = .00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) 	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC017) 	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC019) 	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

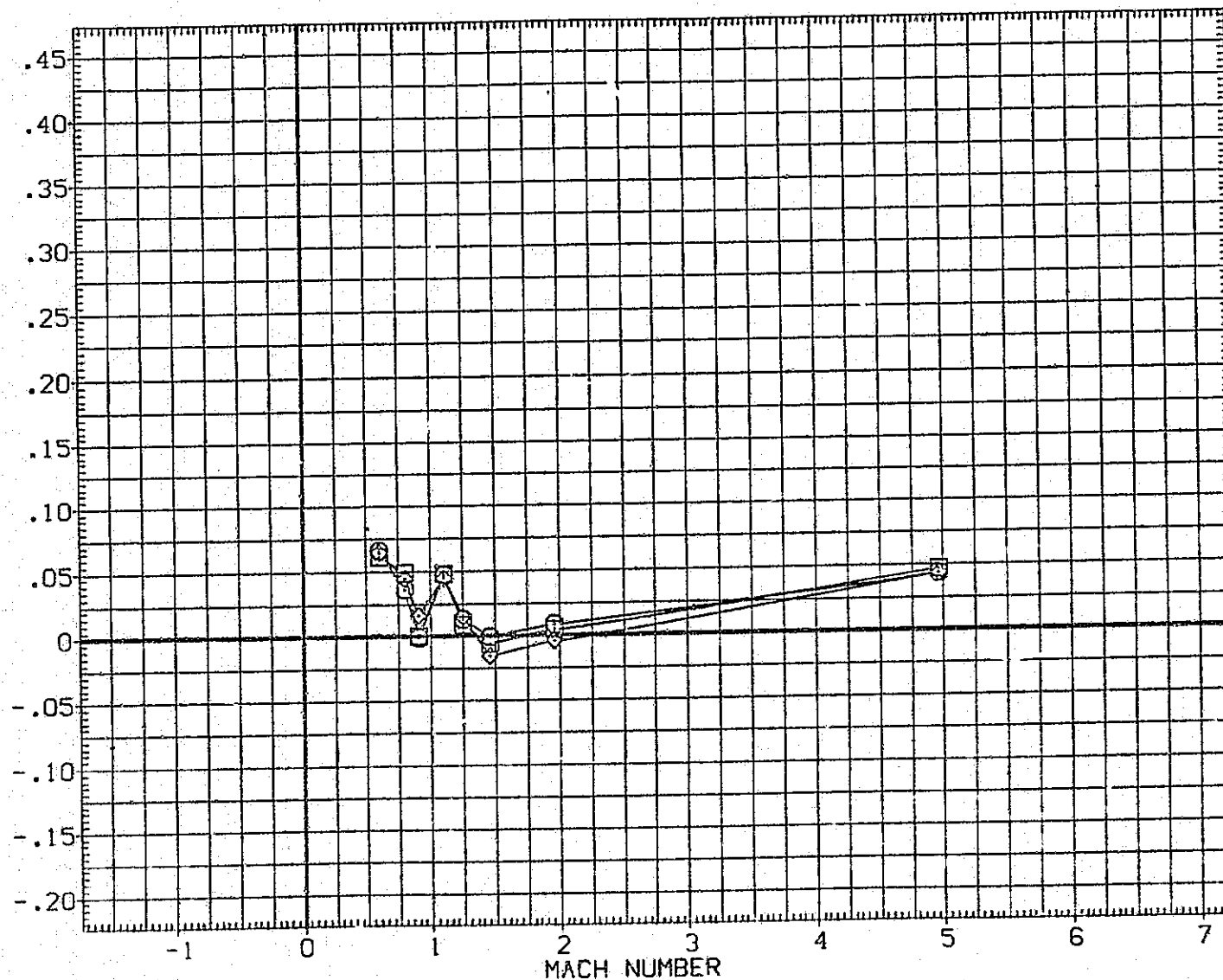


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(G) ALPHA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) ○	MSFC 594 (A33) 740TS (TIP) SIP201 ORB STING
(VIC017) □	MSFC 594 (A33) 740TS (TIP) SIP201 FORKED STING
(VIC019) ◇	MSFC 594 (A33) 740TS (TIP) SIP201 FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	59. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

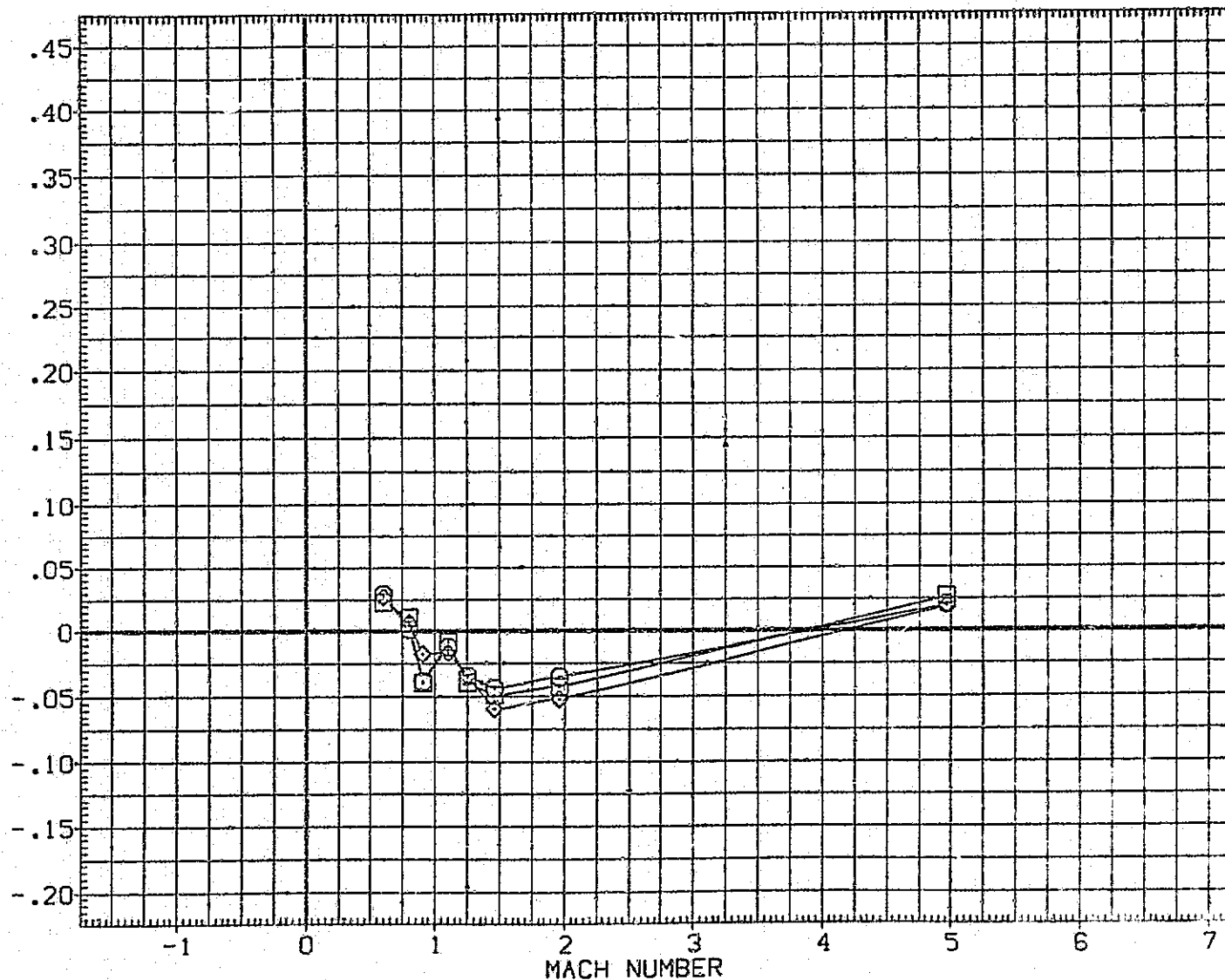


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(H) ALPHA = 4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC007)	MSFC 594 (A33) 740TS (TIPISIP201)	ORB STING
(VIC017)	MSFC 594 (A33) 740TS (TIPISIP201)	FORKED STING
(VIC019)	MSFC 594 (A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

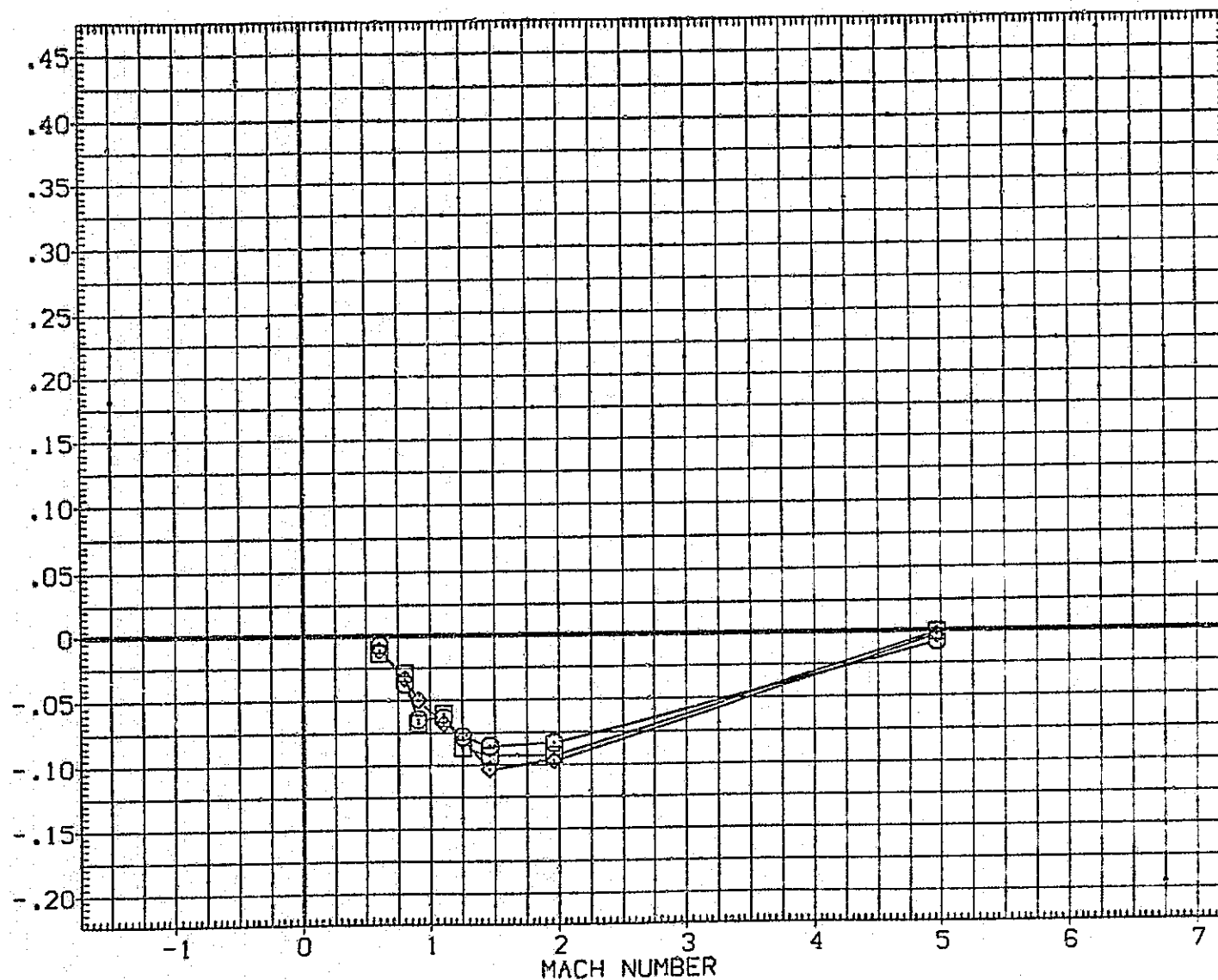


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO
(I) ALPHA = 6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC007) ○	MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING
(VIC017) □	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING
(VIC019) ◇	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

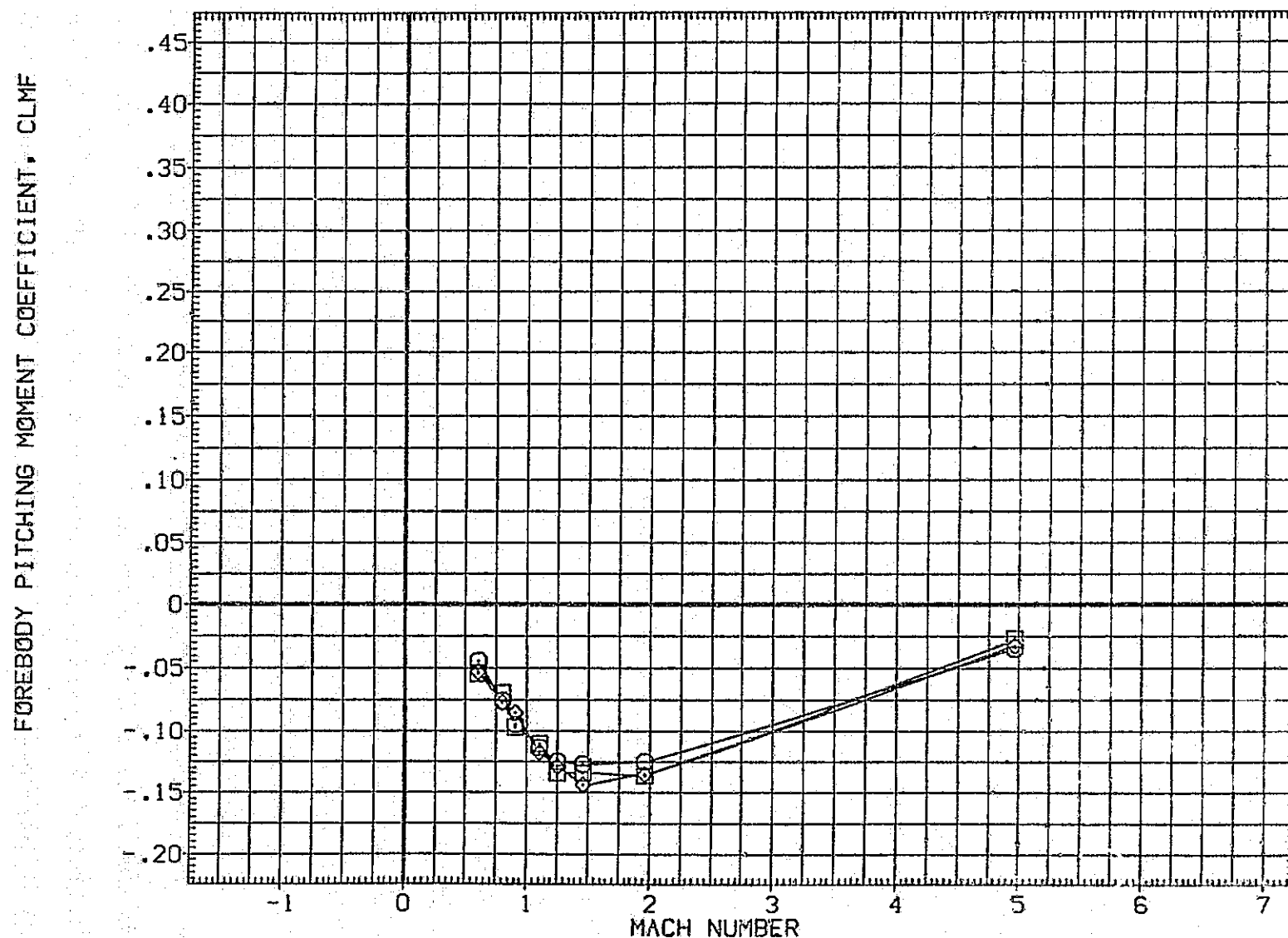


FIG 8 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LONGITUDINAL AERO

(J)ALPHA = 8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC S94(1A33) 740TS (T1P1S1P201)	ORB STING
(AIC018)	MSFC S94(1A33) 740TS (T1P1S1P201)	FORKED STING
(AIC030)	MSFC S94(1A33) 740TS (T1P1S1P201)	FORKED STING

REFERENCE INFORMATION

SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

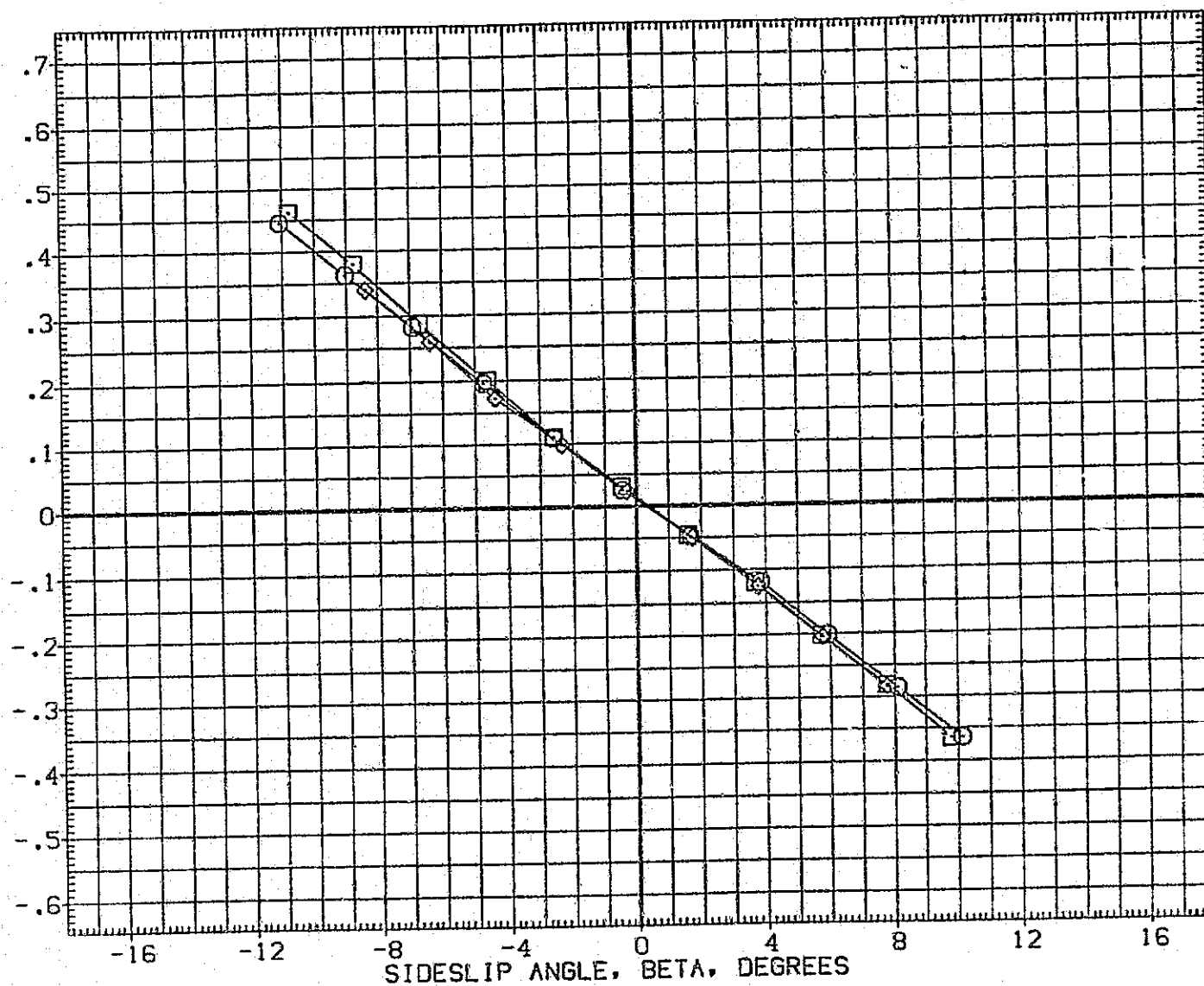


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
[A1C008]	MSFC S94 (A33) 740TS (TIP1SIP201)	
[A1C018]	DATA NOT AVAILABLE	
[A1C030]	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

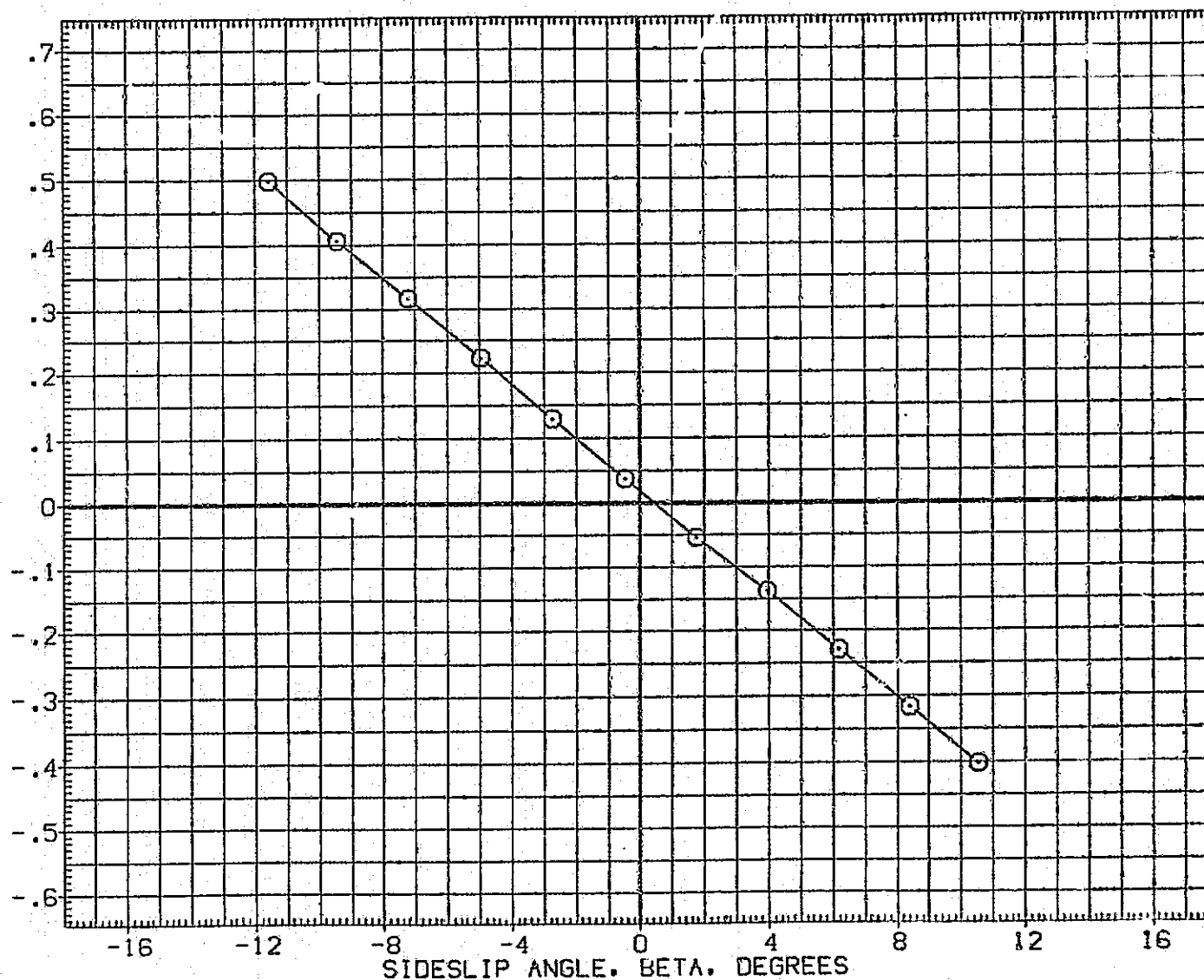


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(B)MACH = .80

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C008) ○	MSFC 594(A33) 740TS (TIPISIP201) ORB STING
(A1C018) □	MSFC 594(A33) 740TS (TIPISIP201) FORKED STING
(A1C030) ◇	MSFC 594(A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, C_Y

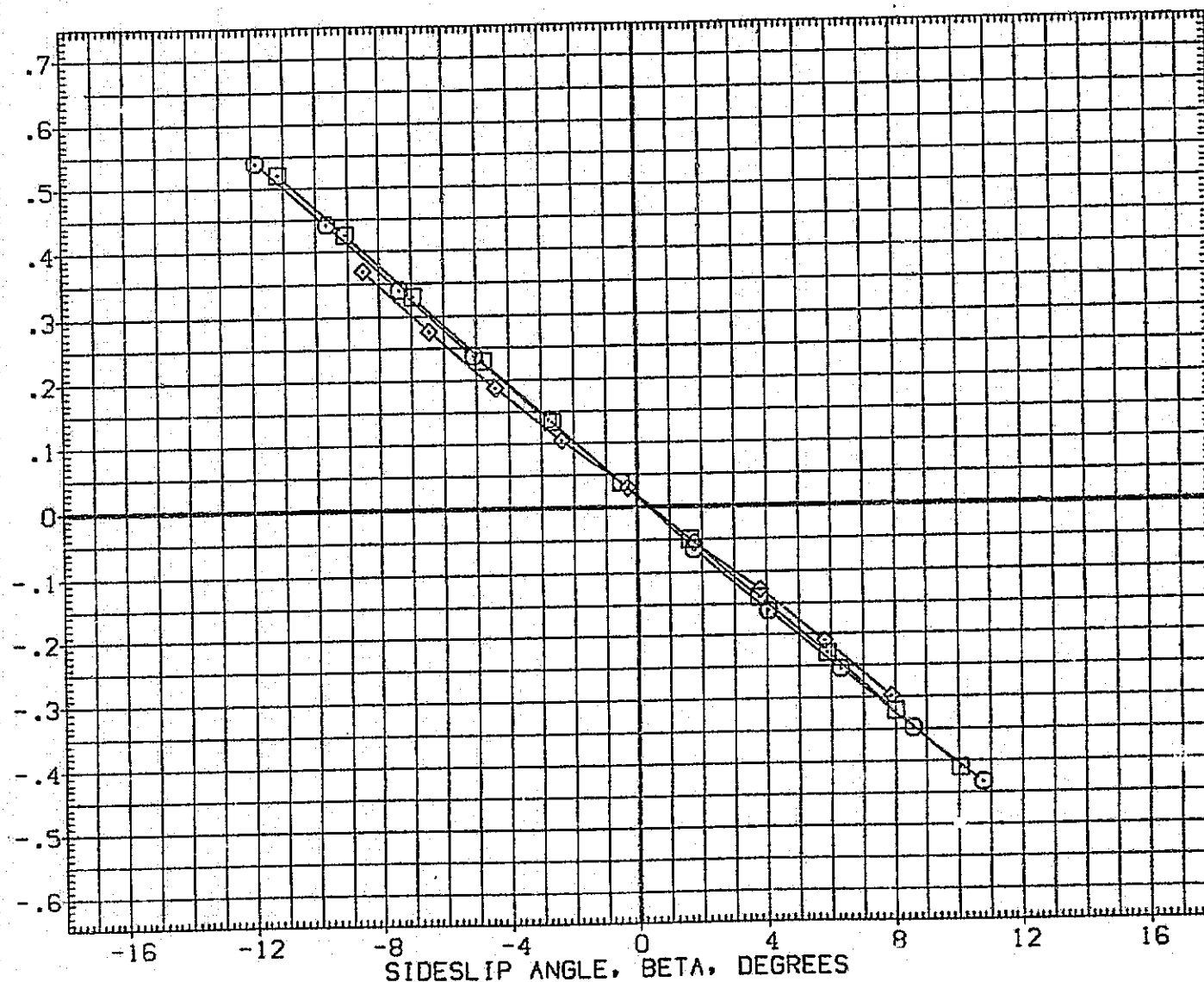


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(A1C008)	MSFC S94(1A33) 740TS (T1P1S1P201)	
(A1C018)	DATA NOT AVAILABLE	
(A1C030)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

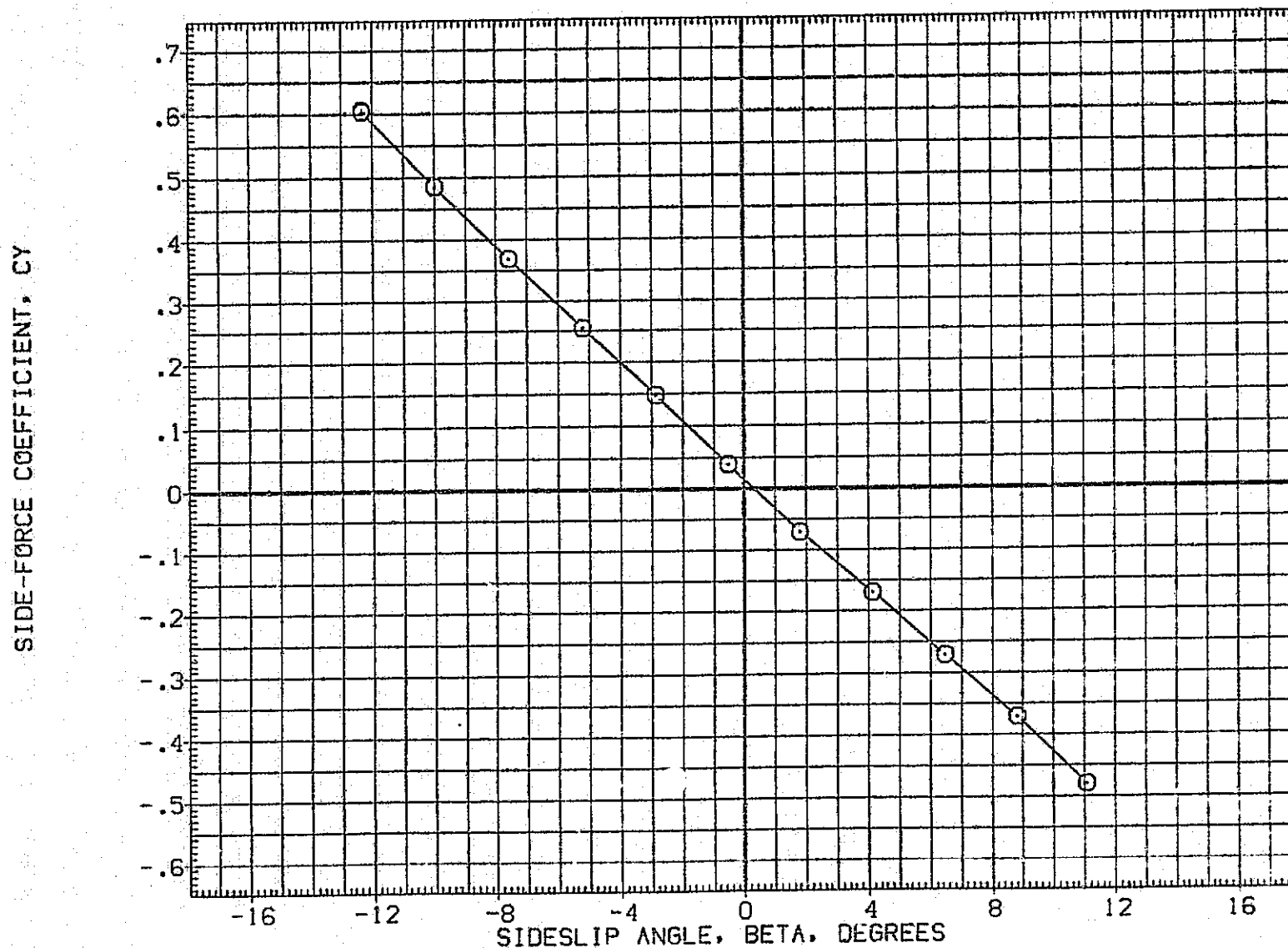


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(D)MACH = 1.05

DATA SET SYMBOL CONFIGURATION DESCRIPTION

[A1C008]	□	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING
[A1C018]	□	MSFC 594(1A33) 740TS (TIP1SIP201)	FORKED STING
[A1C030]	◇	MSFC 594(1A33) 740TS (TIP1SIP201)	FORKED STING

REFERENCE INFORMATION

SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

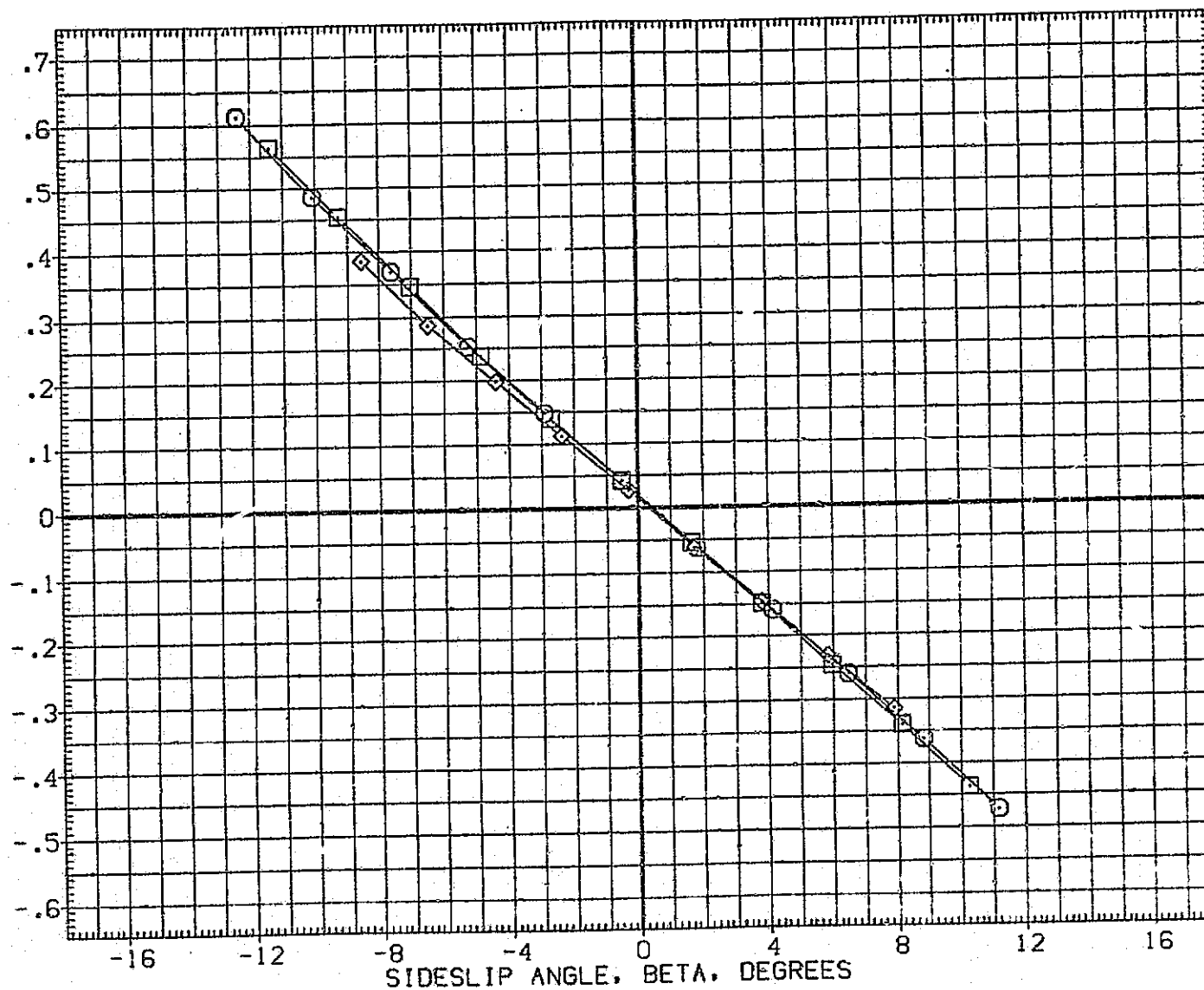


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C008)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(A1C018)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(A1C030)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

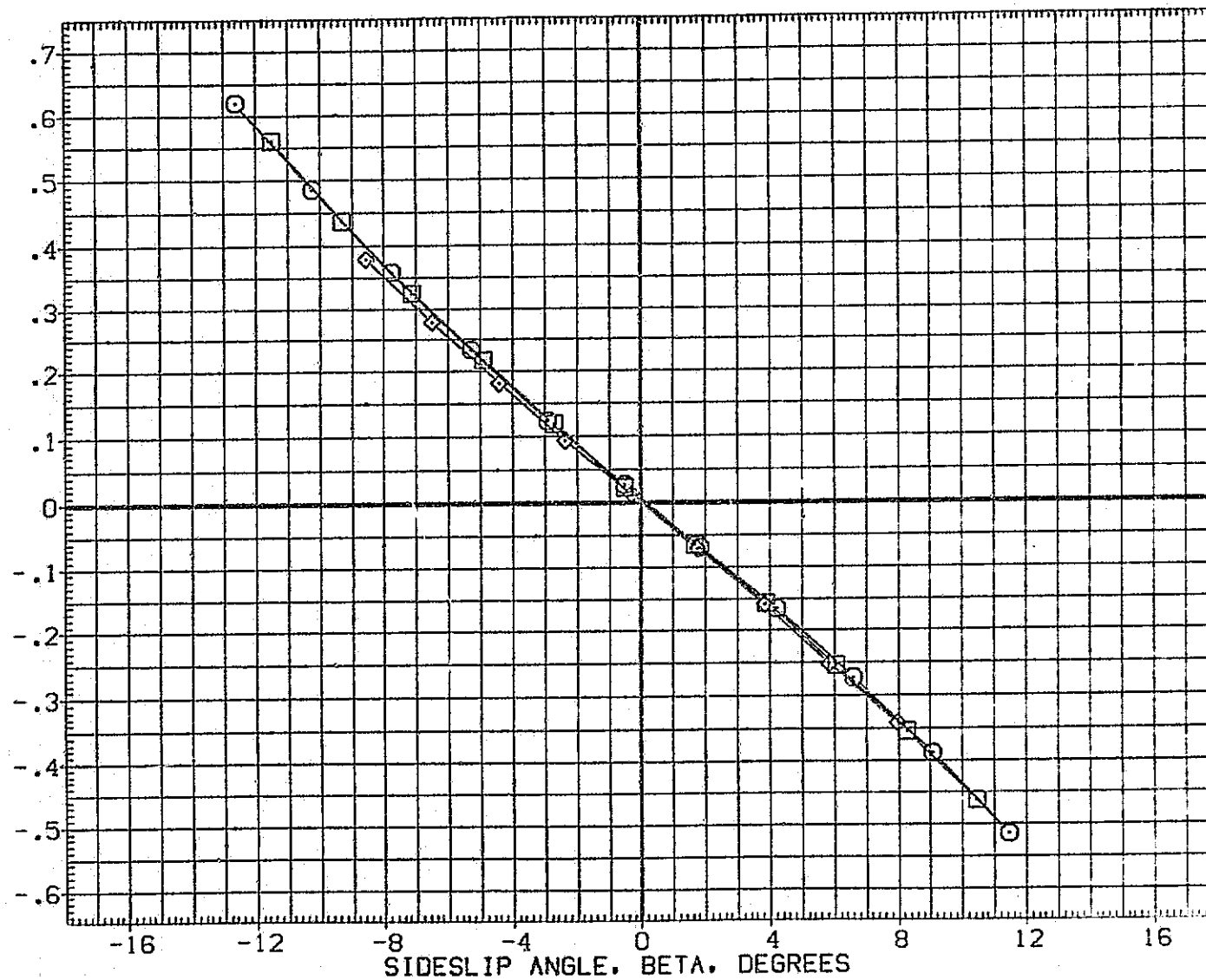


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(F)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIG STING
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	OR8 STING
(AIC018)	DATA NOT AVAILABLE	
(AIC030)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

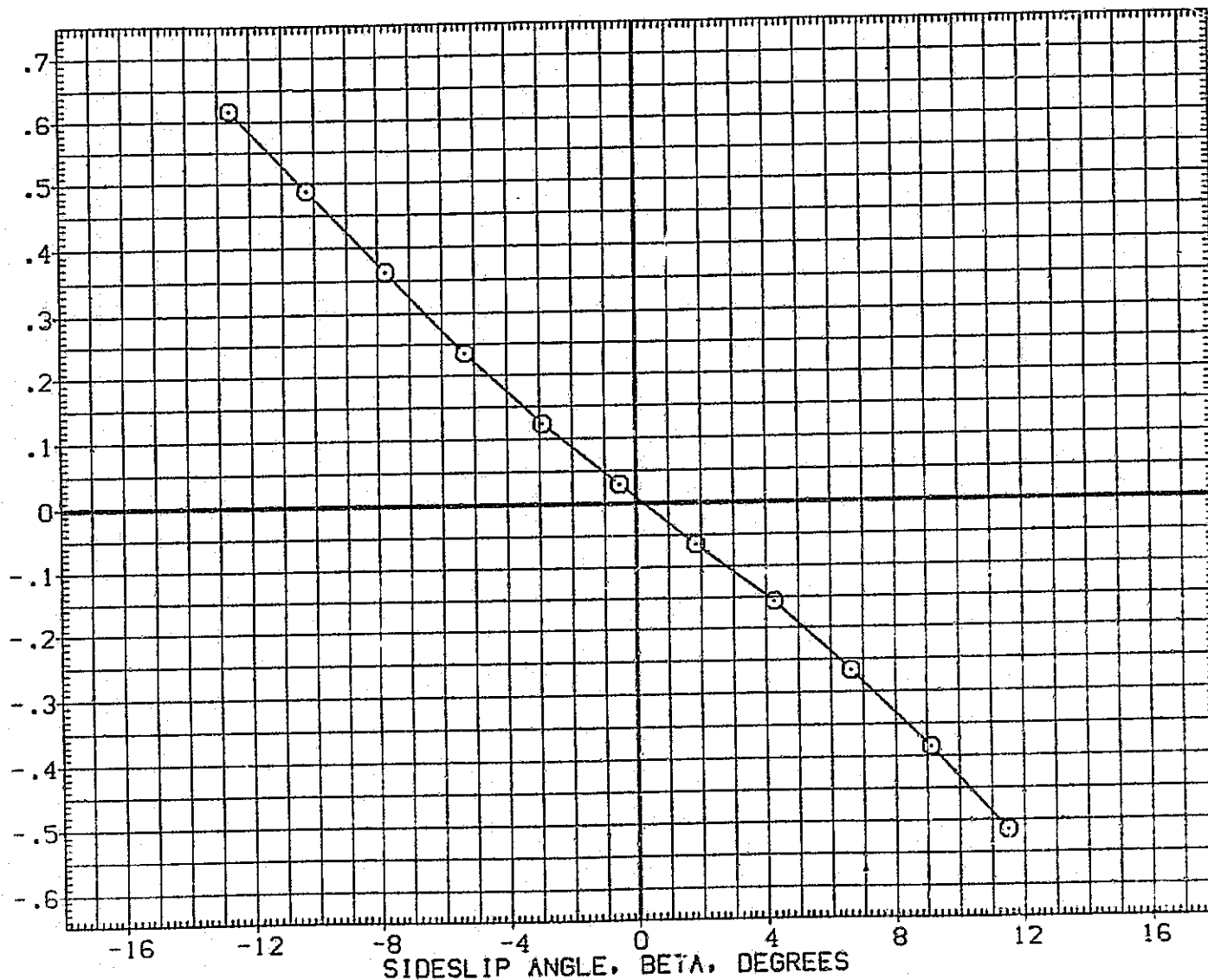


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(G)MACH = 1.47

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C008)	MSFC 594(1A93) 740TS (T1P1S1P201) ORB STING
(A1C018)	MSFC 594(1A93) 740TS (T1P1S1P201) FORKED STING
(A1C030)	MSFC 594(1A93) 740TS (T1P1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

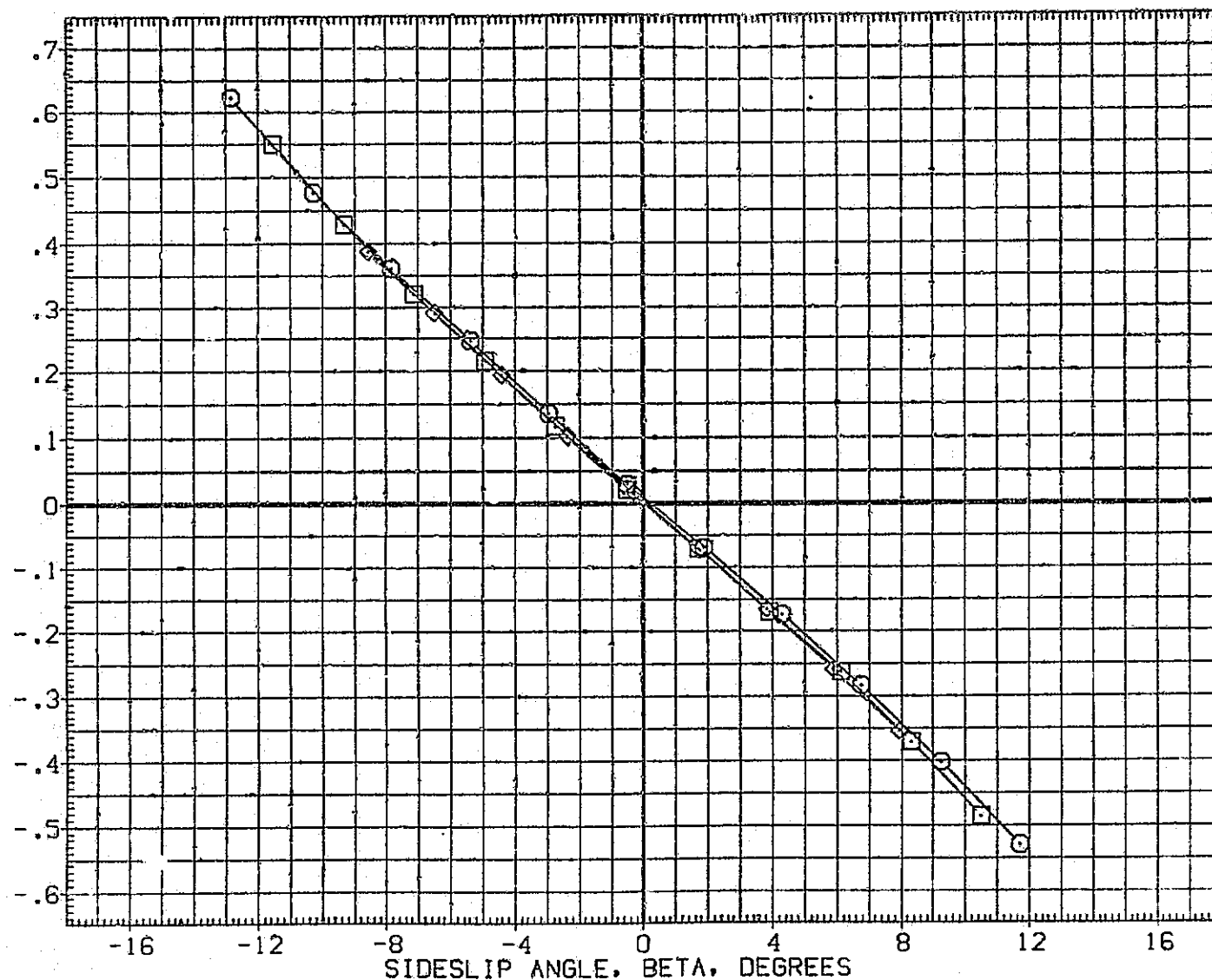


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(H)MACH = 1.97

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(A1C008)	MSFC 594(A33) 740TS (TIPISIP201)	
(A1C018)	DATA NOT AVAILABLE	
(A1C030)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

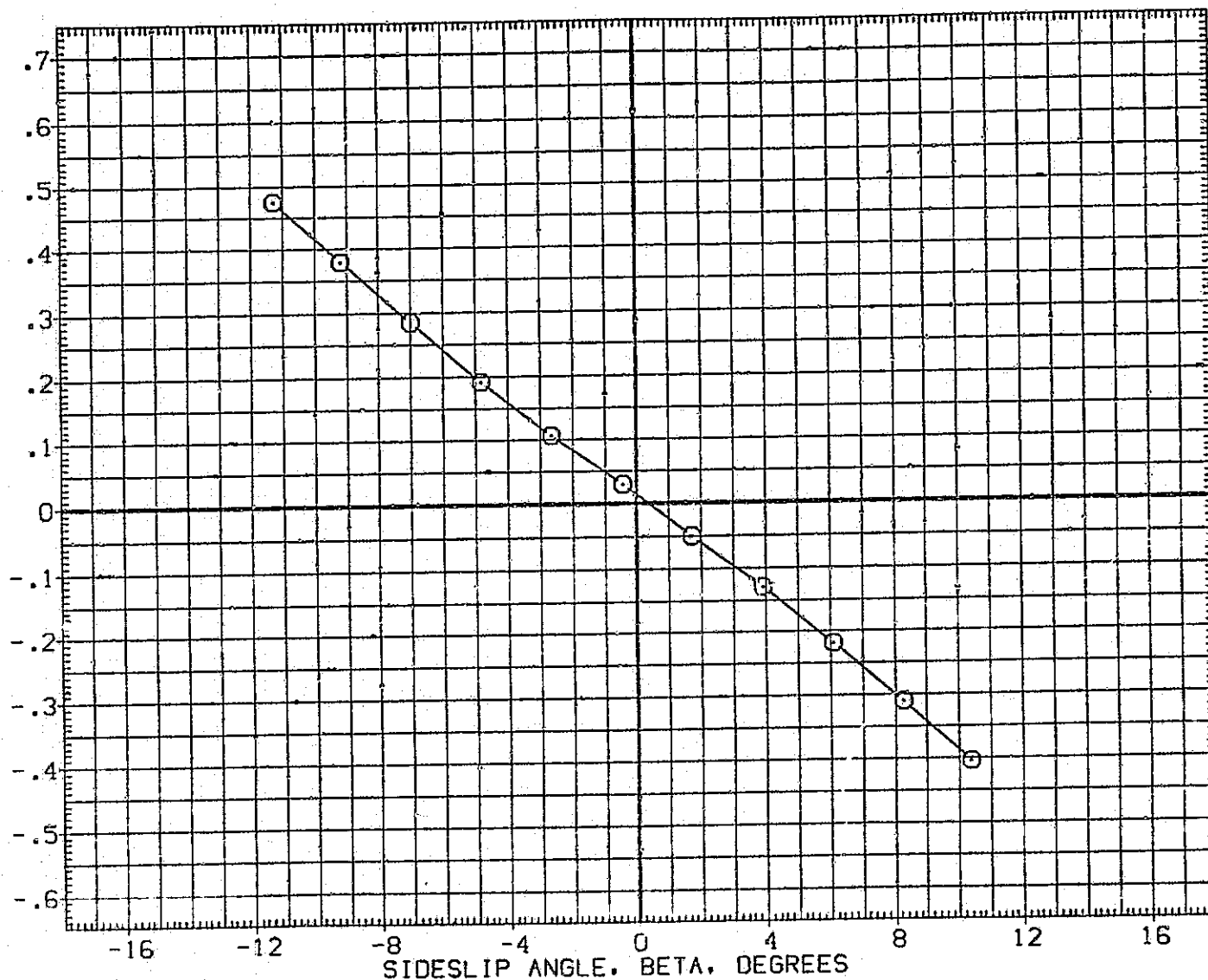


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
 (1)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(AIC008)	MSFC 594(1A33) 740TS (T1P1SIP201)	ORB STING
(AIC018)	MSFC 594(1A33) 740TS (T1P1SIP201)	FORKED STING
(AIC030)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

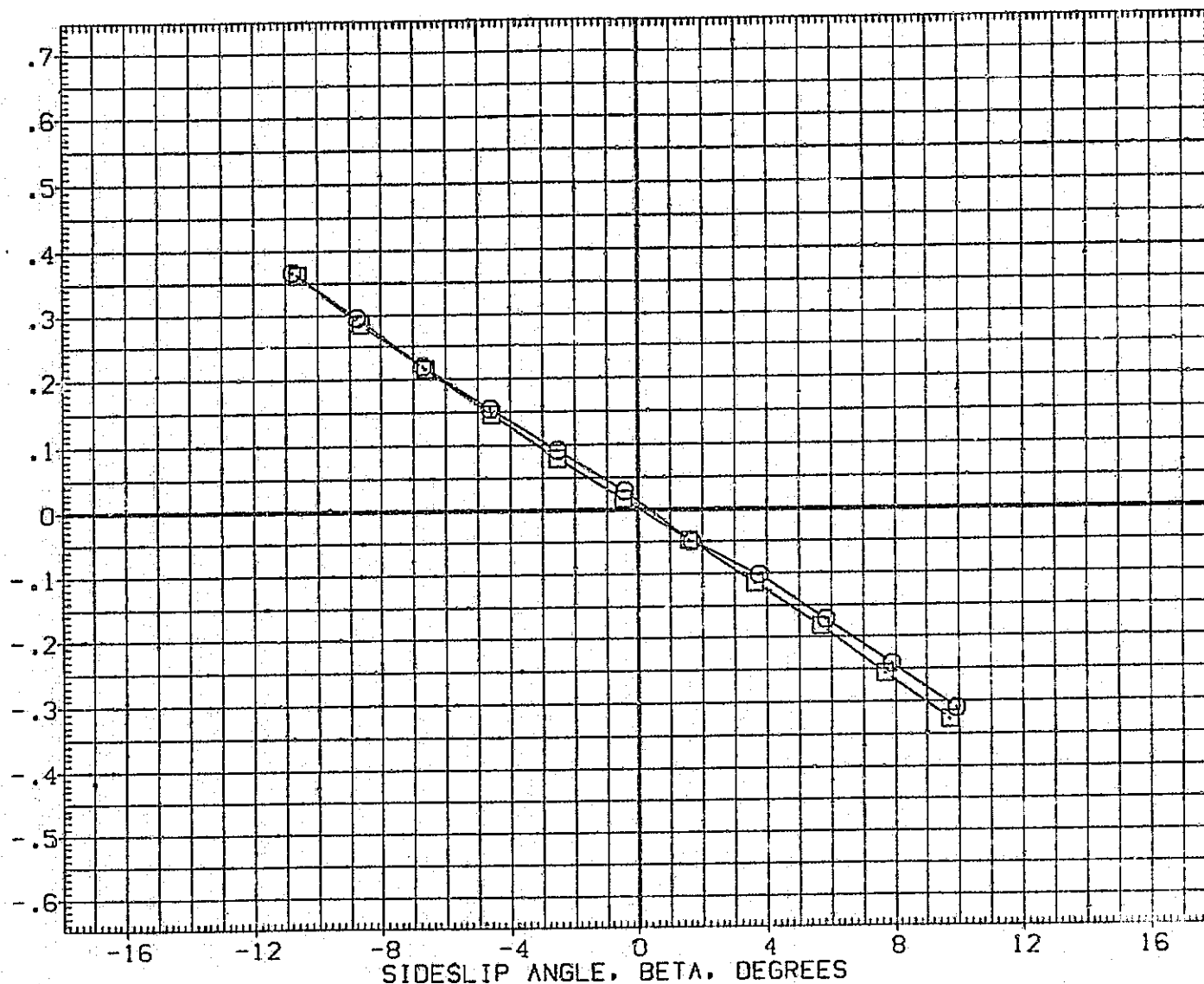


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(AIC018)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(AIC030)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

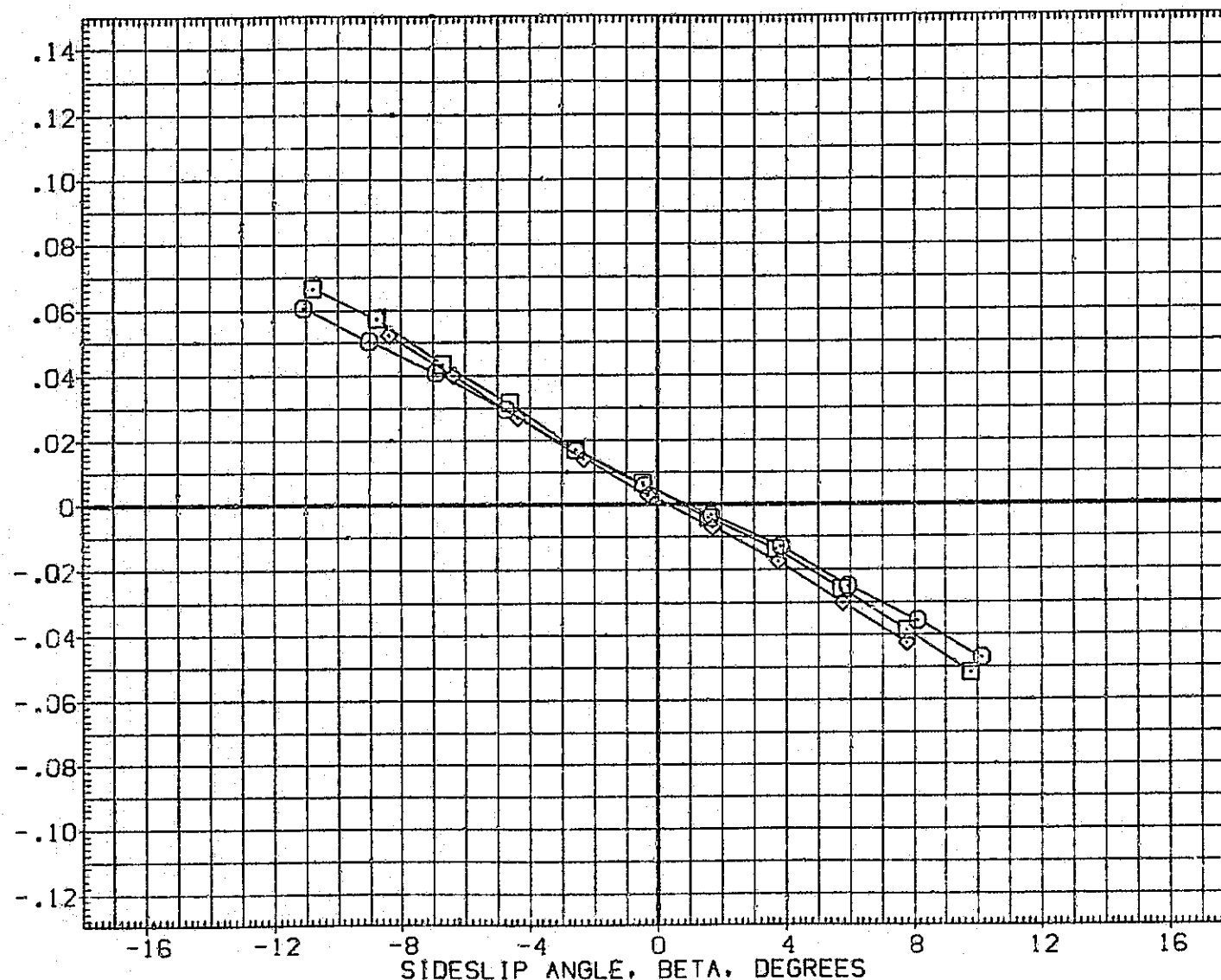


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(A)MACH = .60

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING

[AIC008] ☐ MSFC 594([A33] 740TS (TIP)SIP201)

[AIC018] ☐ DATA NOT AVAILABLE

[AIC030] ☐ DATA NOT AVAILABLE

REFERENCE INFORMATION

SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

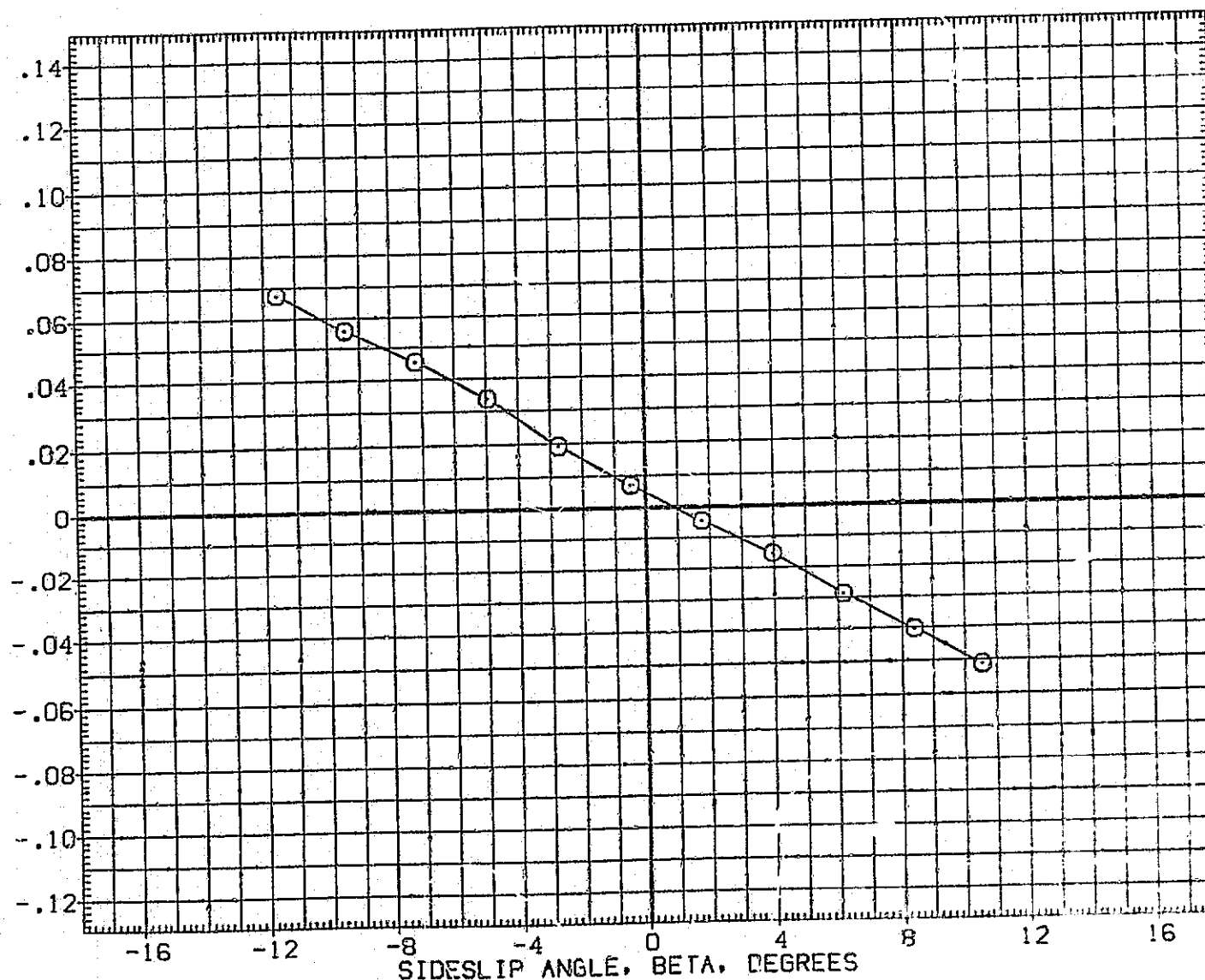


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008) ○	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(AIC018) □	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(AIC030) ◇	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

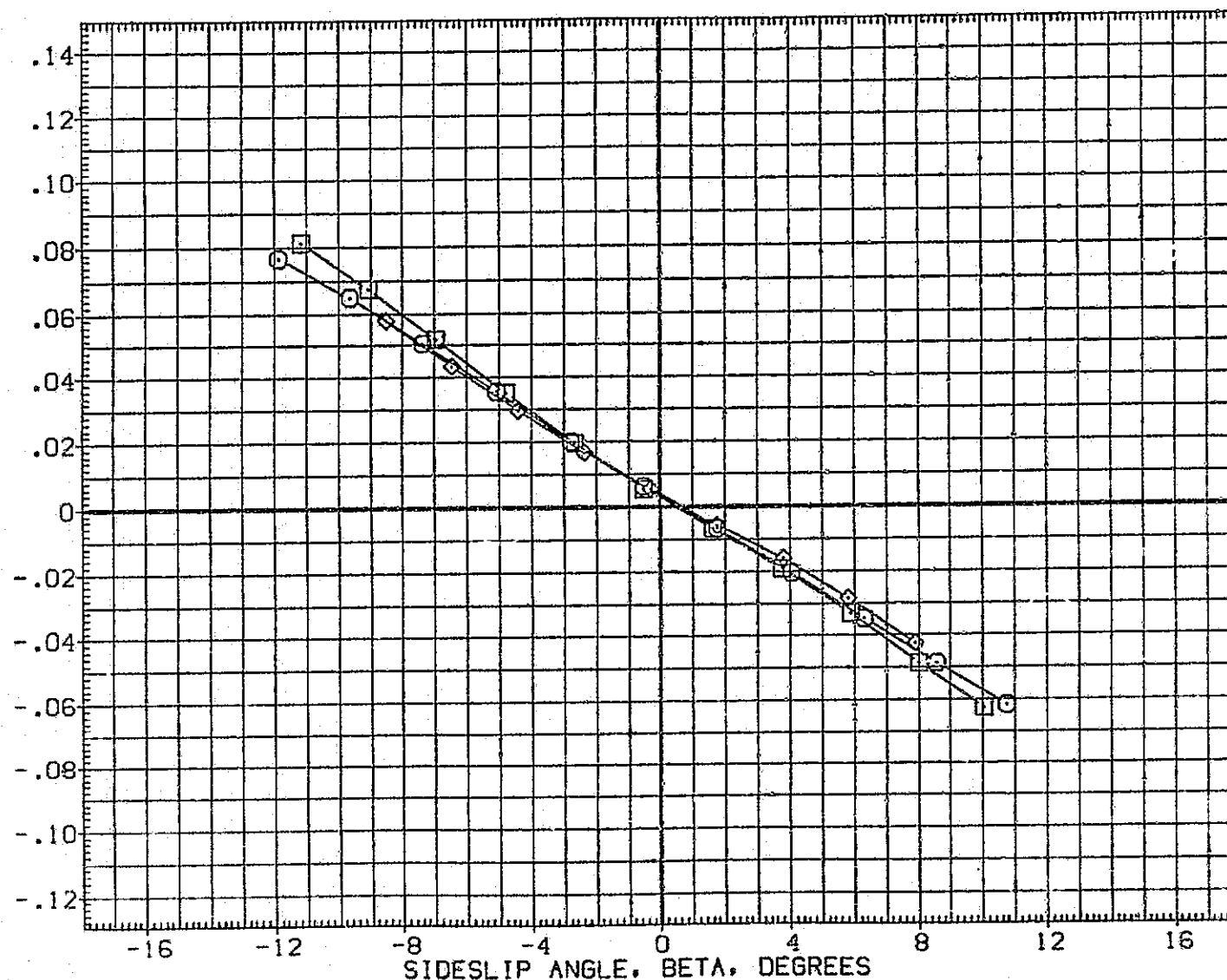


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	
(AIC018)	DATA NOT AVAILABLE	
(AIC030)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1295.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

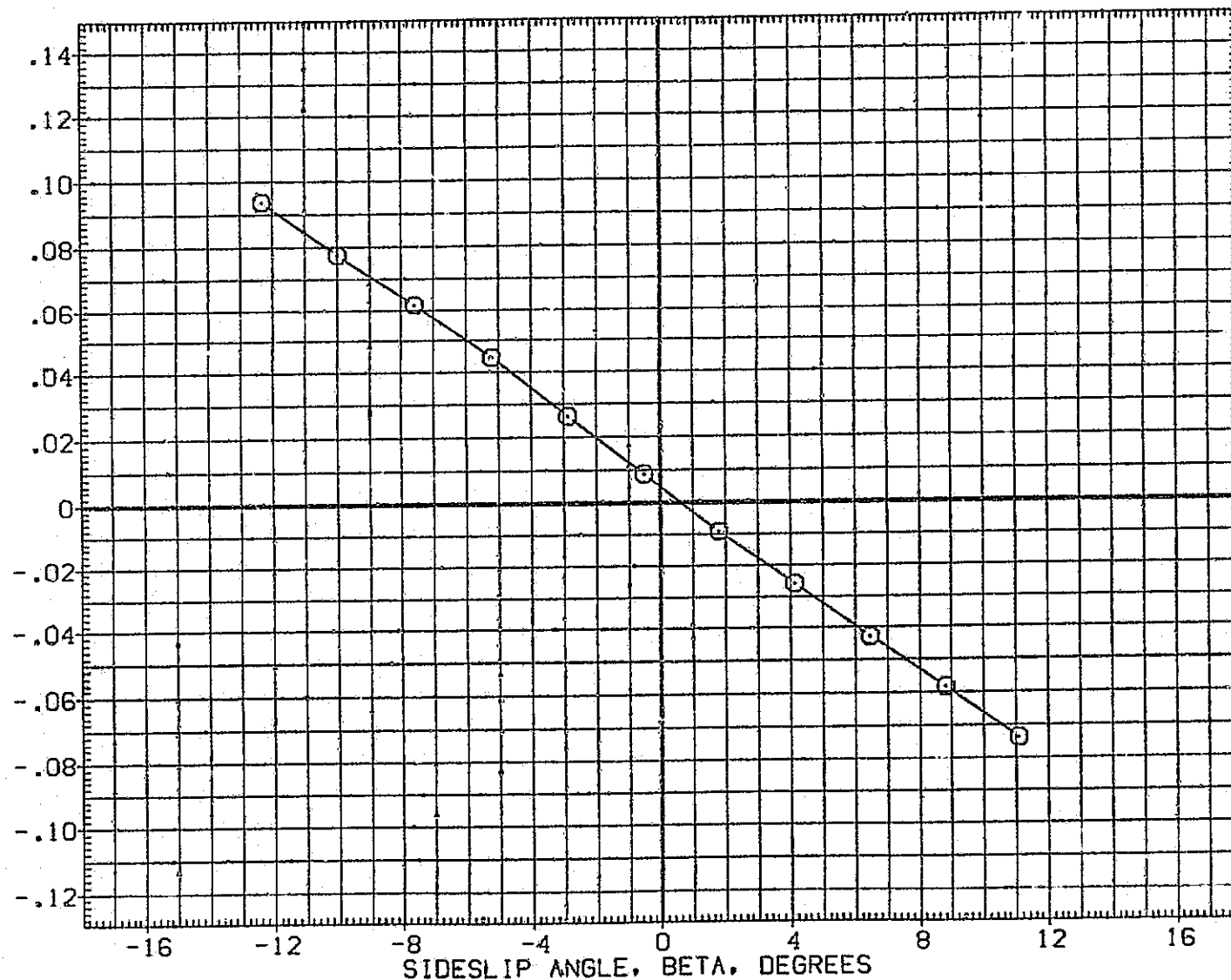


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(AIC018)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(AIC030)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

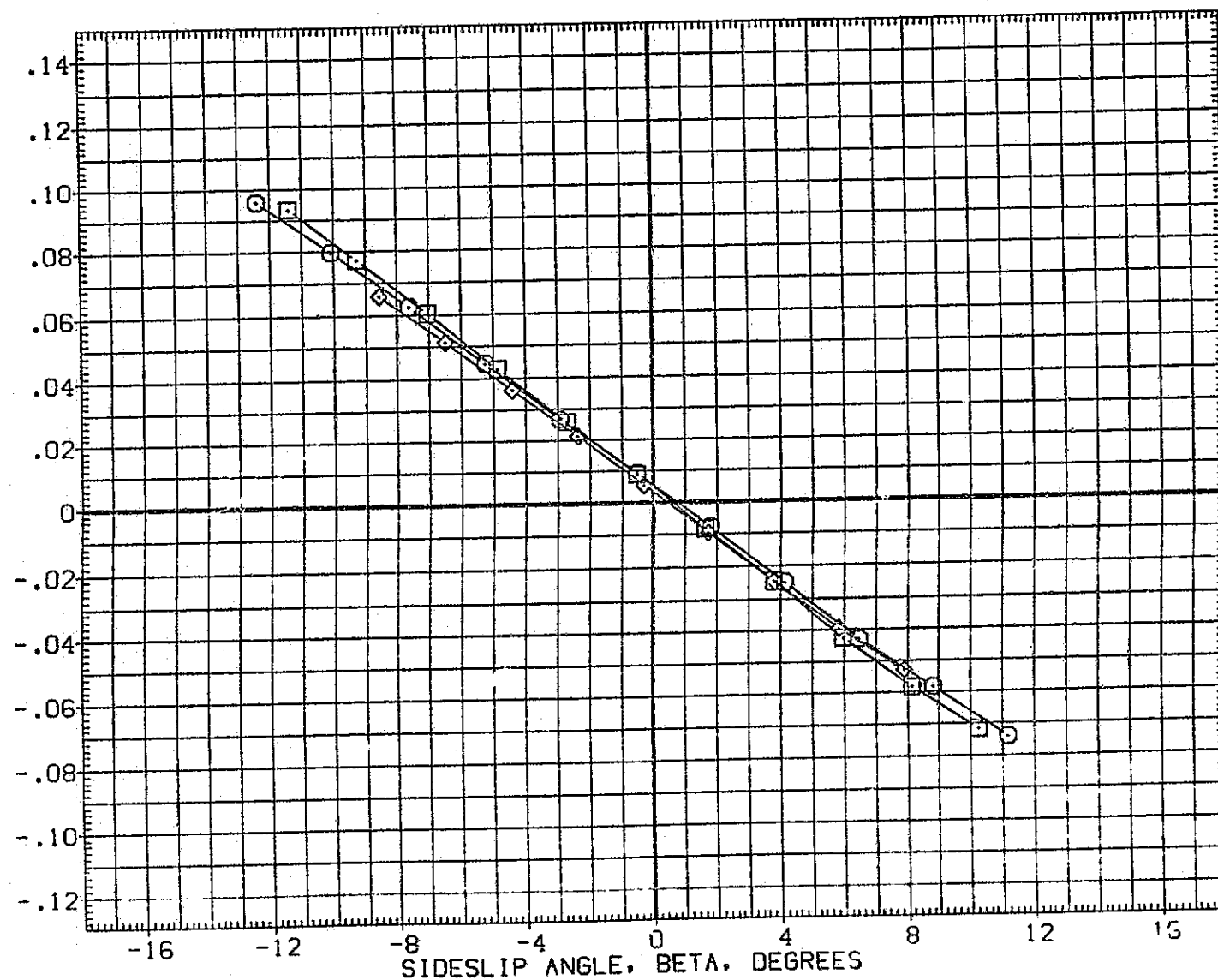





FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008) 	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(AIC018) 	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(AIC030) 	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XM RP	976.0000	IN. XT
YM RP	.0000	IN. YT
ZM RP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

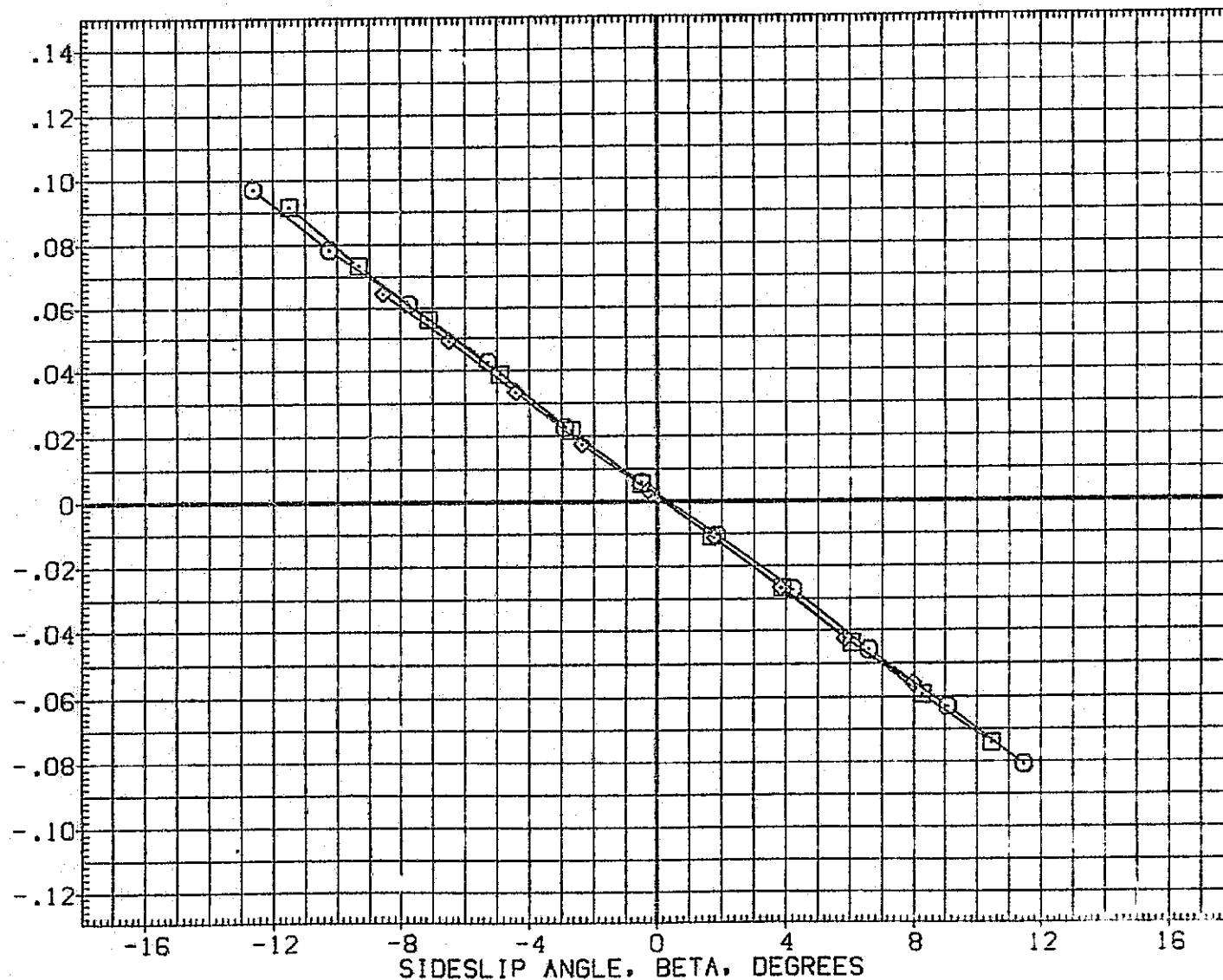


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(F)MACH = 1.25

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING

{AIC008} □ MSFC 594(1A33) 740TS (TIP1SIP201)

{AIC018} □ DATA NOT AVAILABLE

{AIC030} □ DATA NOT AVAILABLE

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

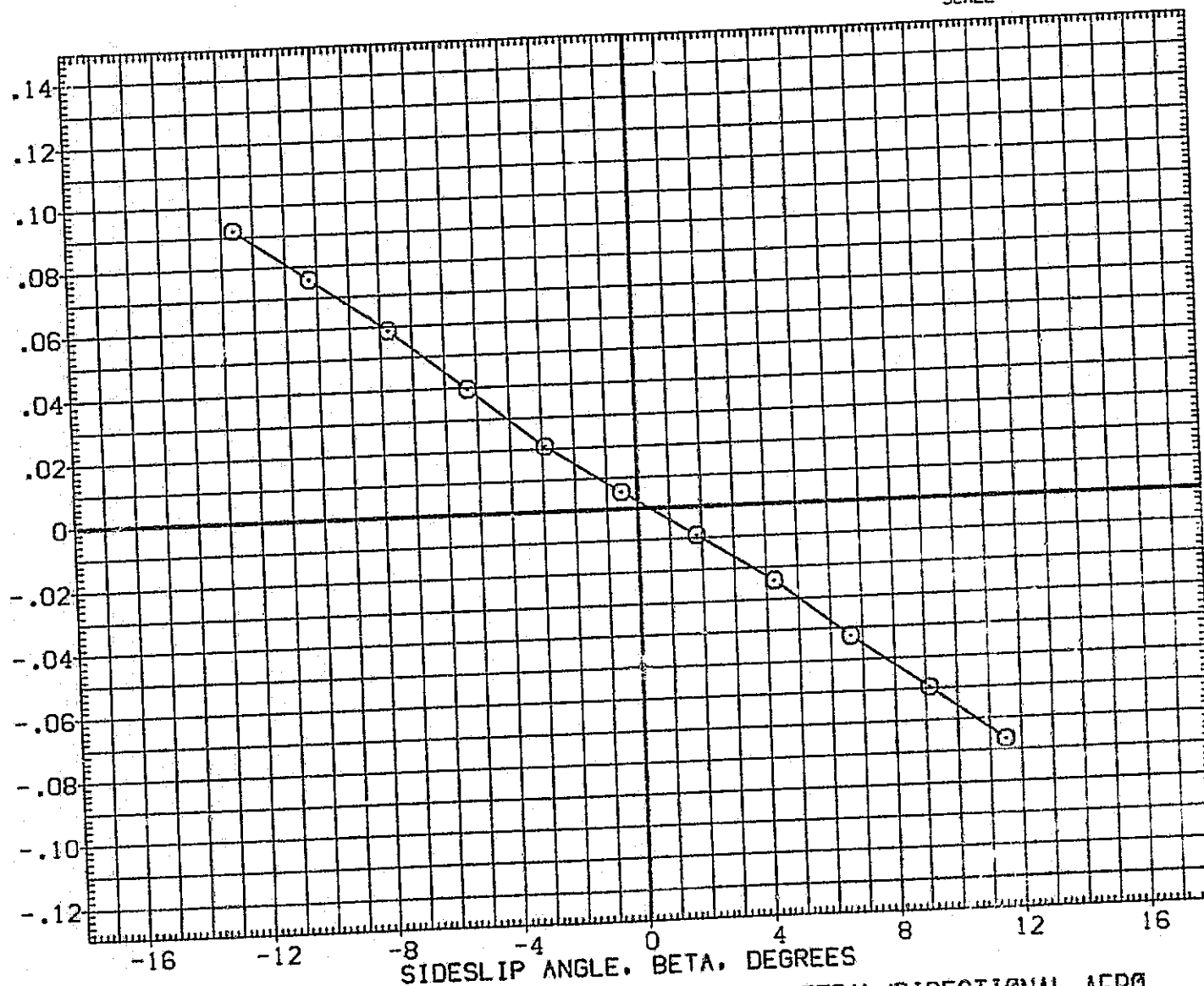


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

{G}MACH = 1.47

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008)	MSFC 594 (A33) 740TS (TIPISIP201) ORB STING
(AIC018)	MSFC 594 (A33) 740TS (TIPISIP201) FORKED STING
(AIC030)	MSFC 594 (A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

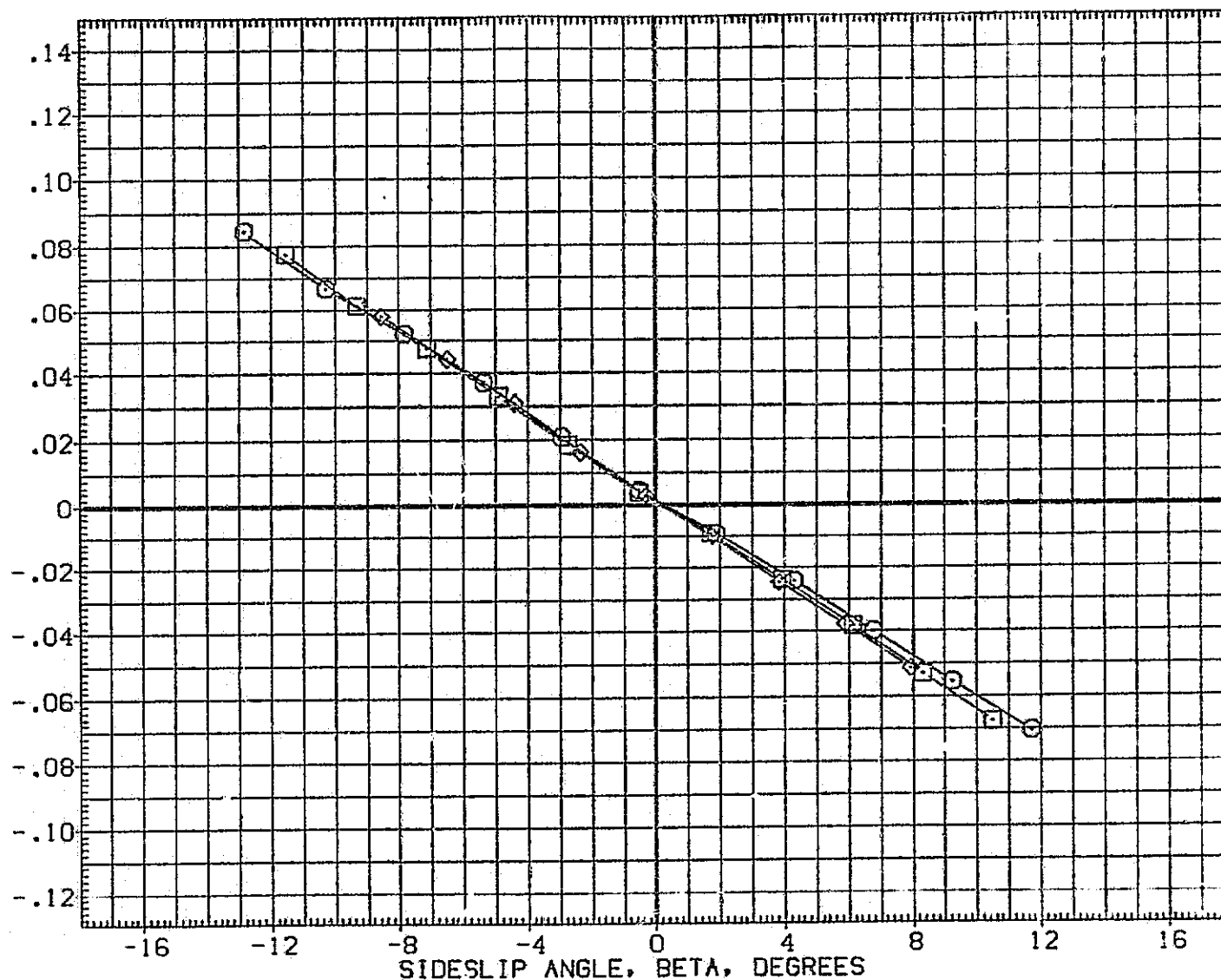


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(H)MACH = 1.97

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC S94(1A33) 740TS (TIPISIP201)	
(AIC018)	DATA NOT AVAILABLE	
(AIC030)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

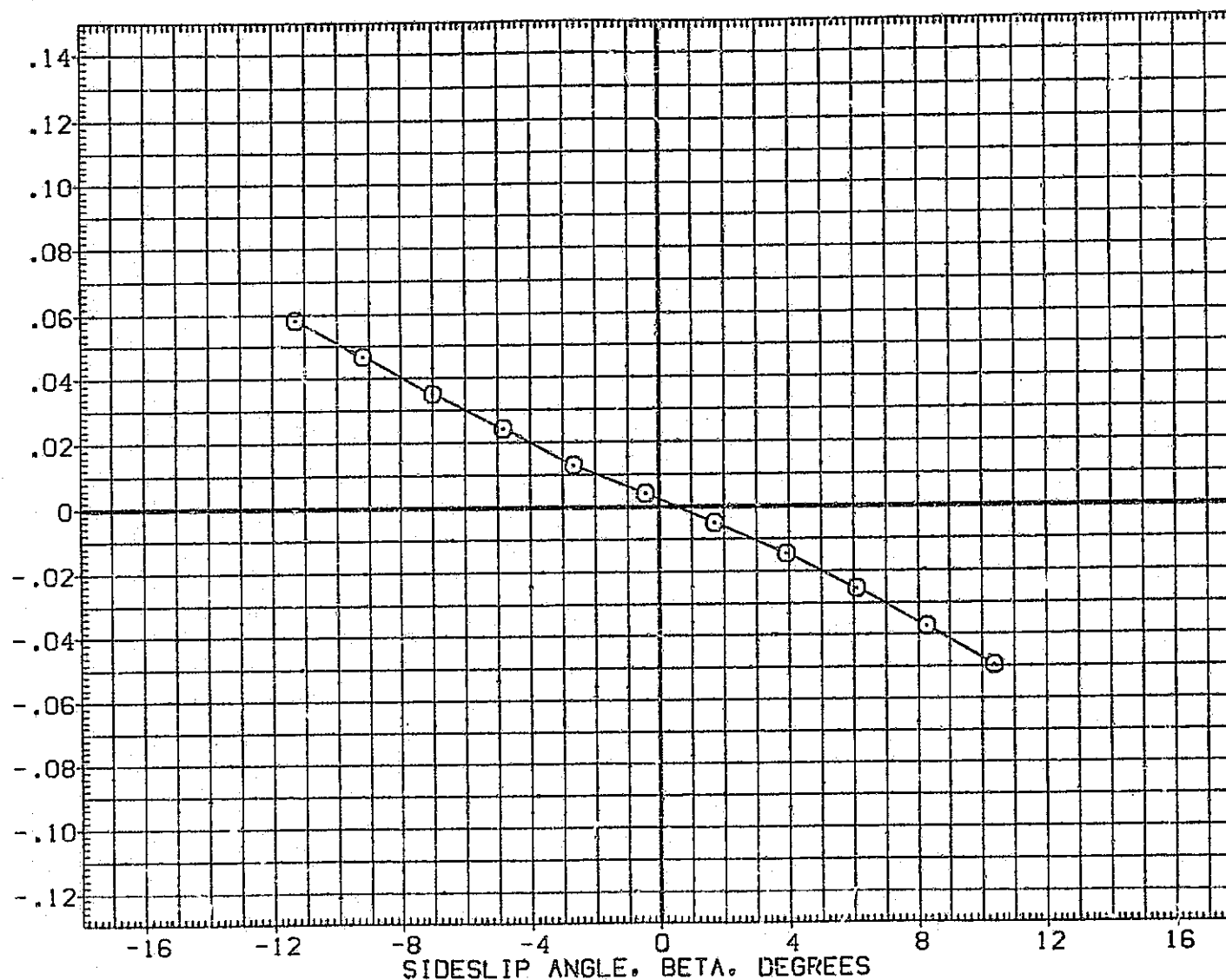


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(1)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (TIP)SIP201)	ORB STING
(AIC018)	MSFC 594(1A33) 740TS (TIP)SIP201)	FORKED STING
(AIC030)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

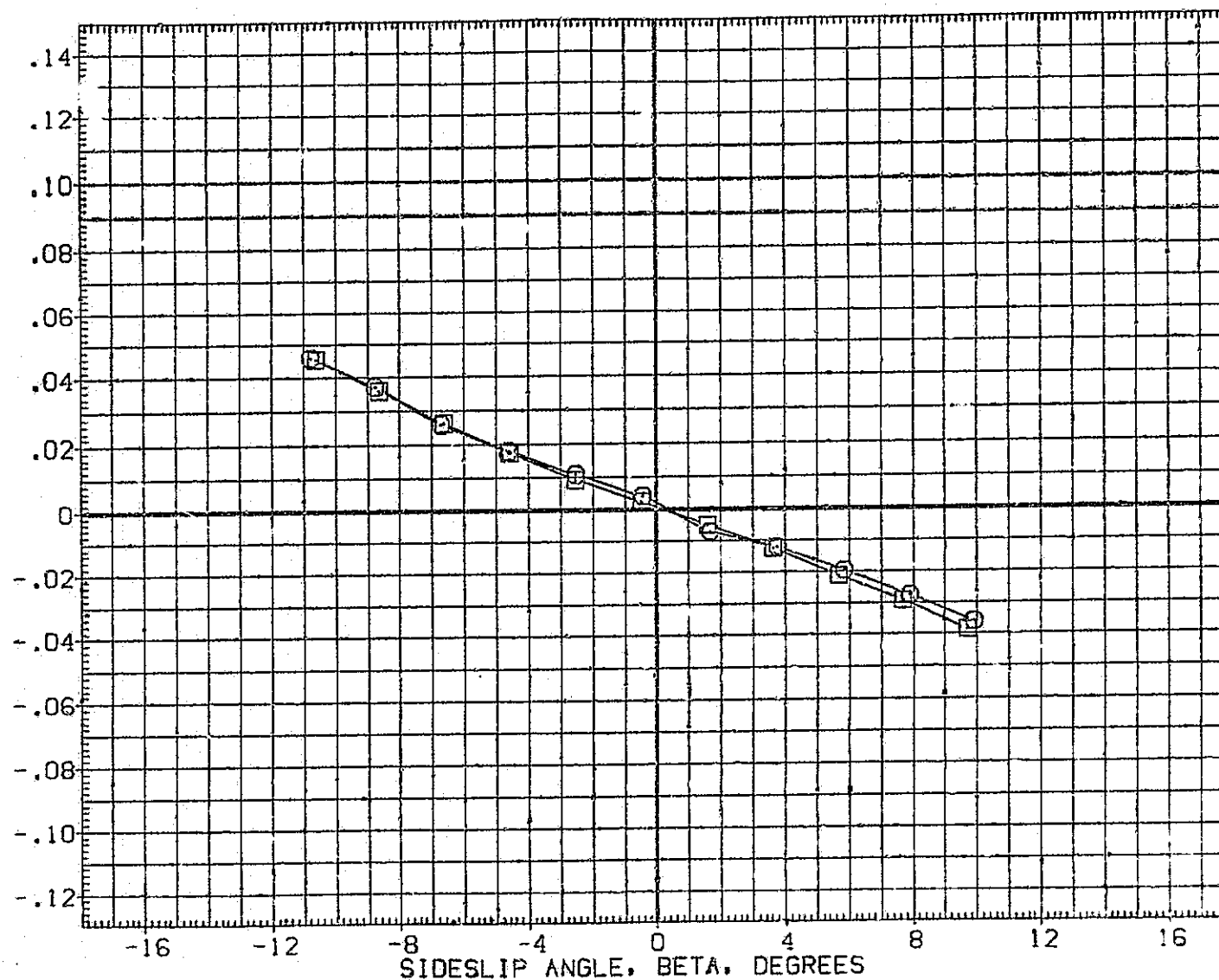


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008) ○	MSFC 594(1A33) 740TS (TIP)SIP201 ORB STING
(AIC018) □	MSFC 594(1A33) 740TS (TIP)SIP201 FORKED STING
(AIC030) ◇	MSFC 594(1A33) 740TS (TIP)SIP201 FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

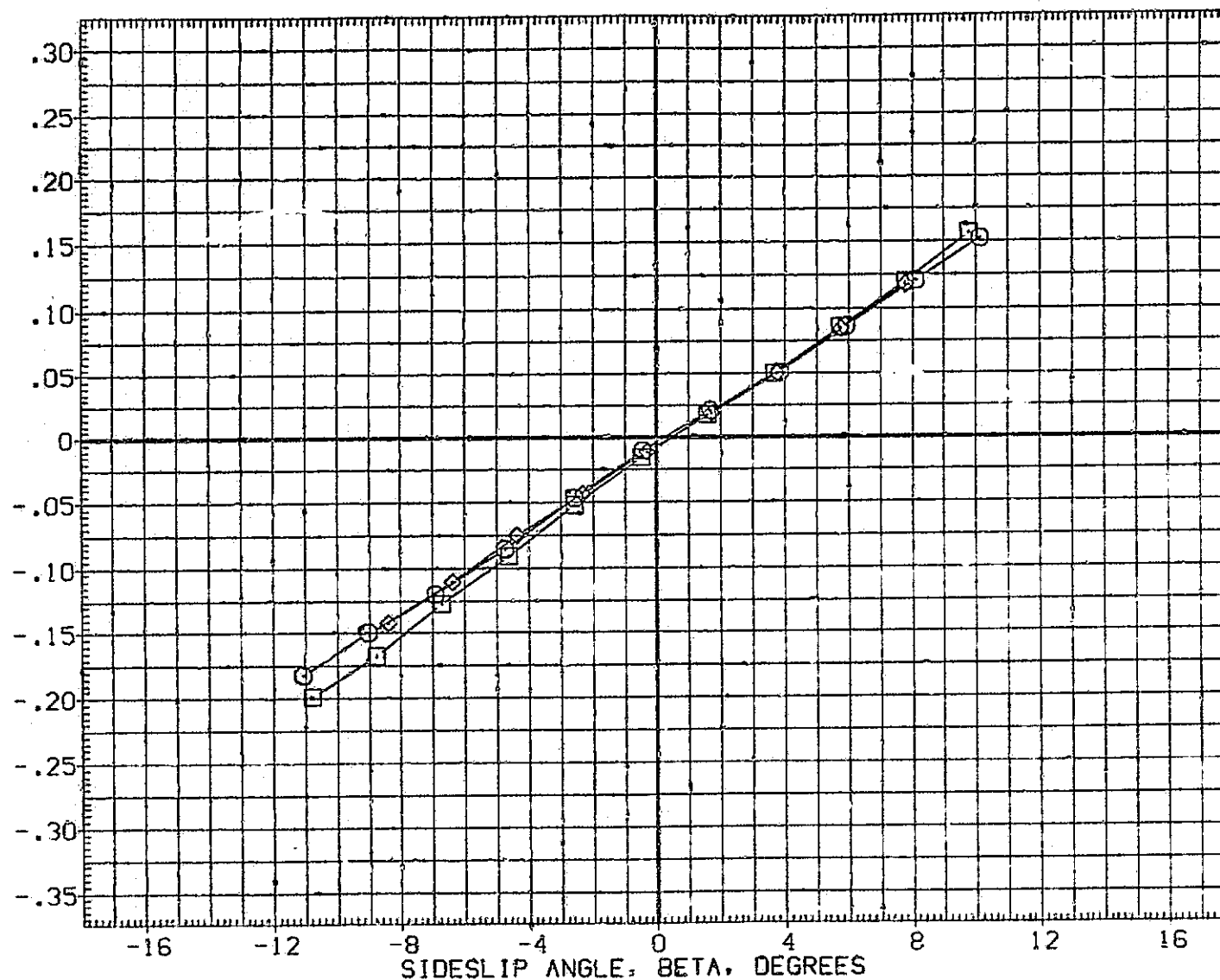


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORBIT
(A1C008)	MSFC 594(1A33) 740TS (T1PISIP201)	ORB STING
(A1C018)	DATA NOT AVAILABLE	
(A1C030)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

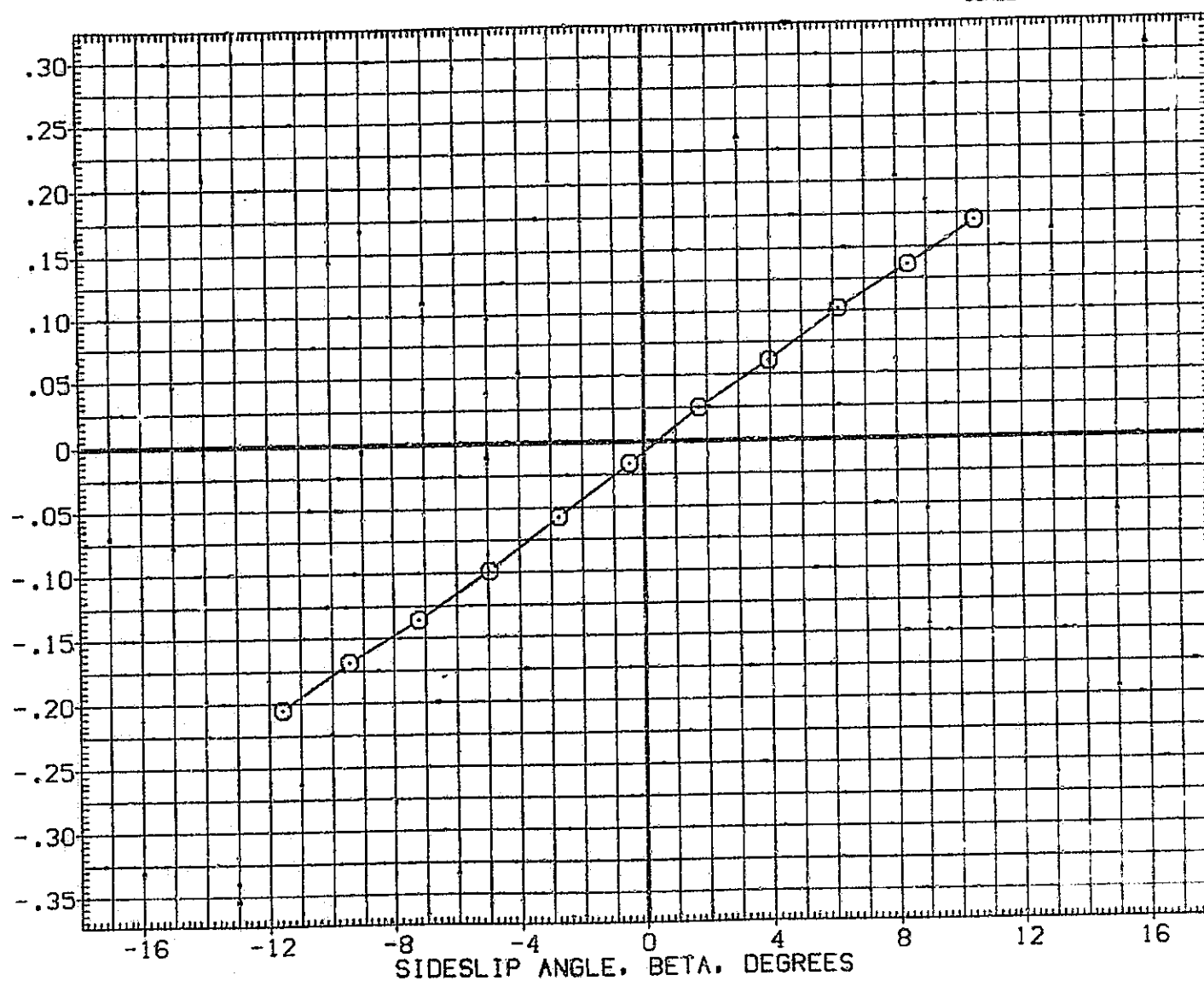


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
 (B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(AIC018)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(AIC030)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

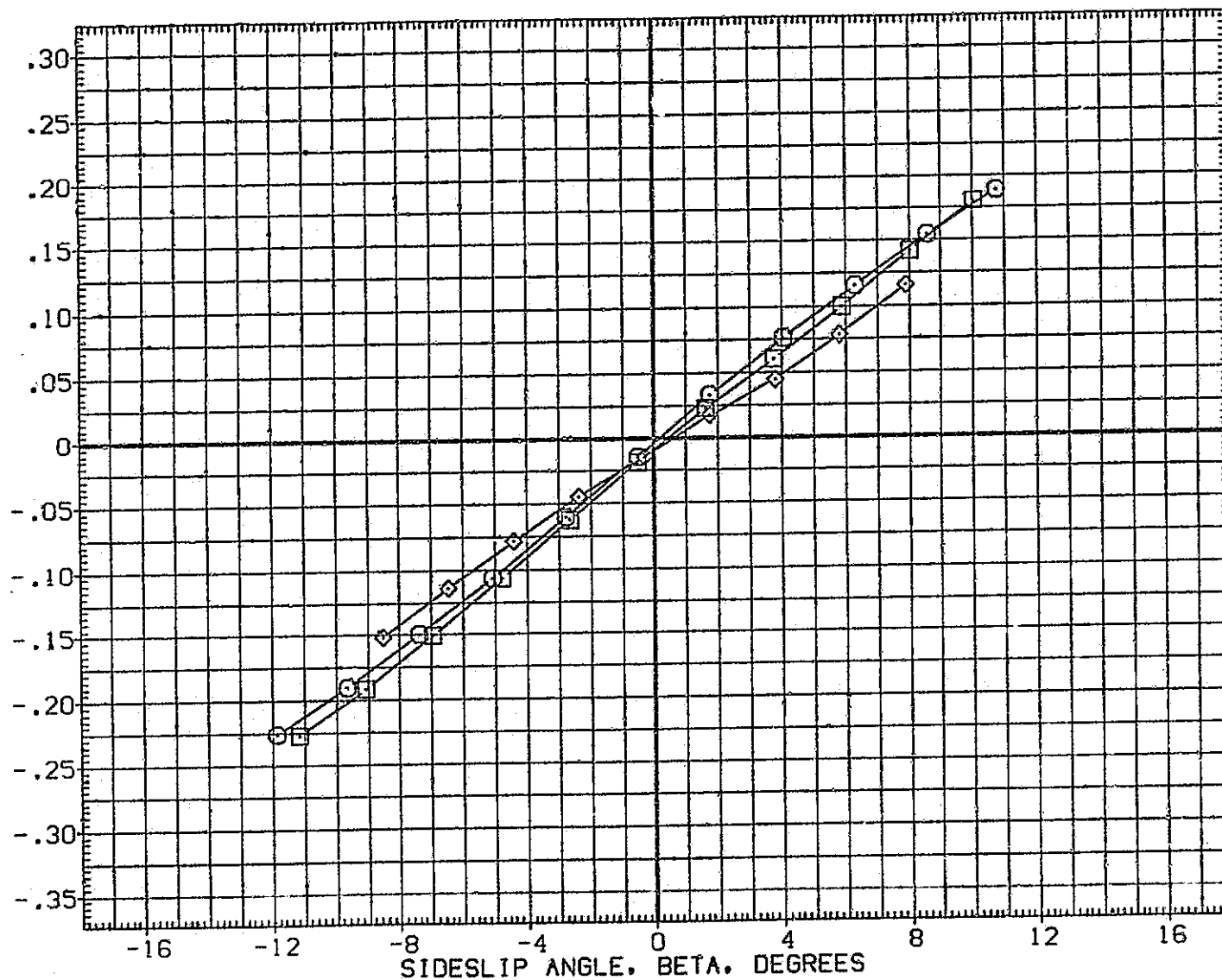


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 594 (A33) 740TS (TIPISIP201)	
(AIC018)	DATA NOT AVAILABLE	
(AIC030)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
IREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

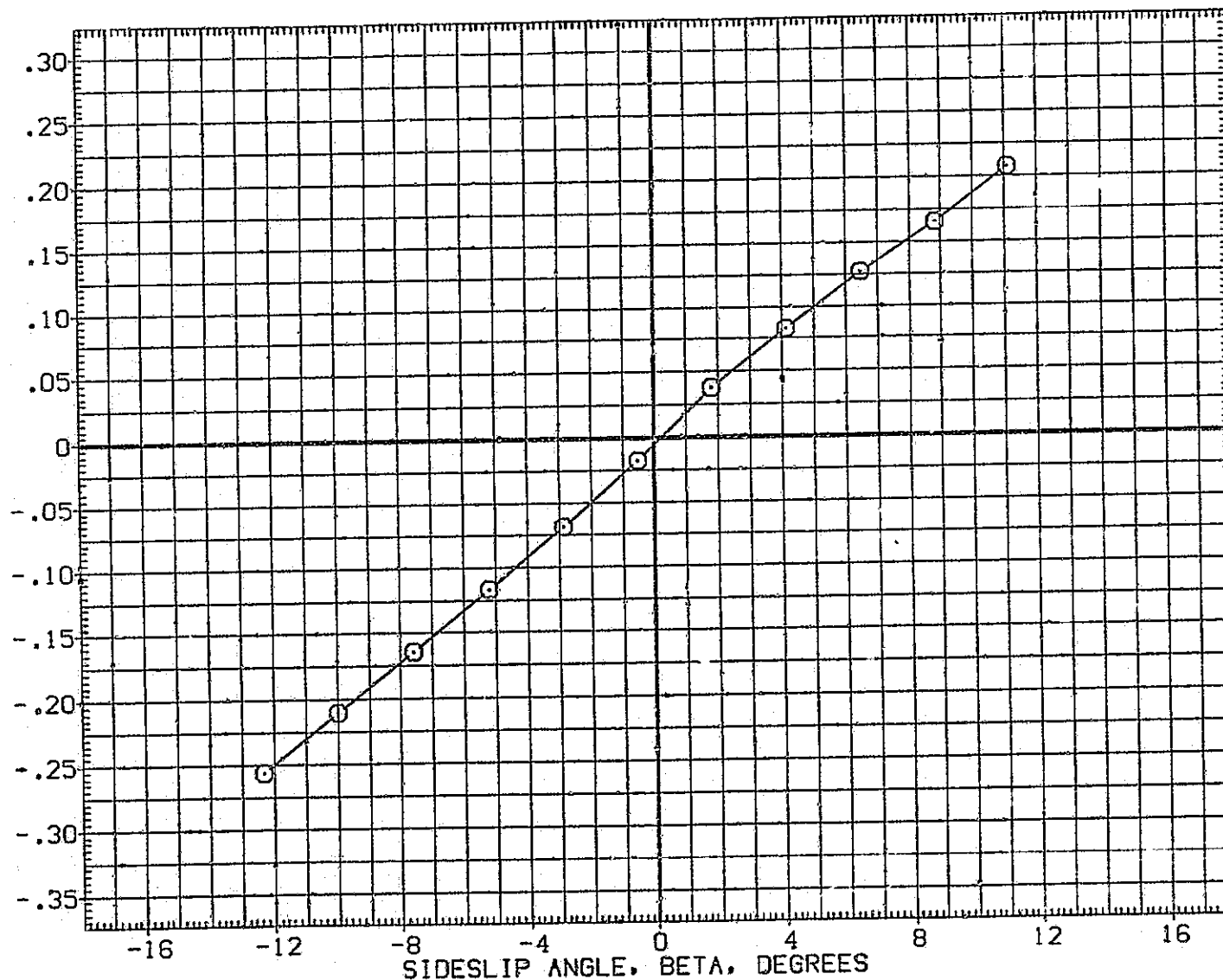


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIG STING
(A1C008)	MSFC S94(1A33) 740TS (T1P1S1P201)	ORIG STING
(A1C018)	MSFC S94(1A33) 740TS (T1P1S1P201)	FORKED STING
(A1C030)	MSFC S94(1A33) 740TS (T1P1S1P201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

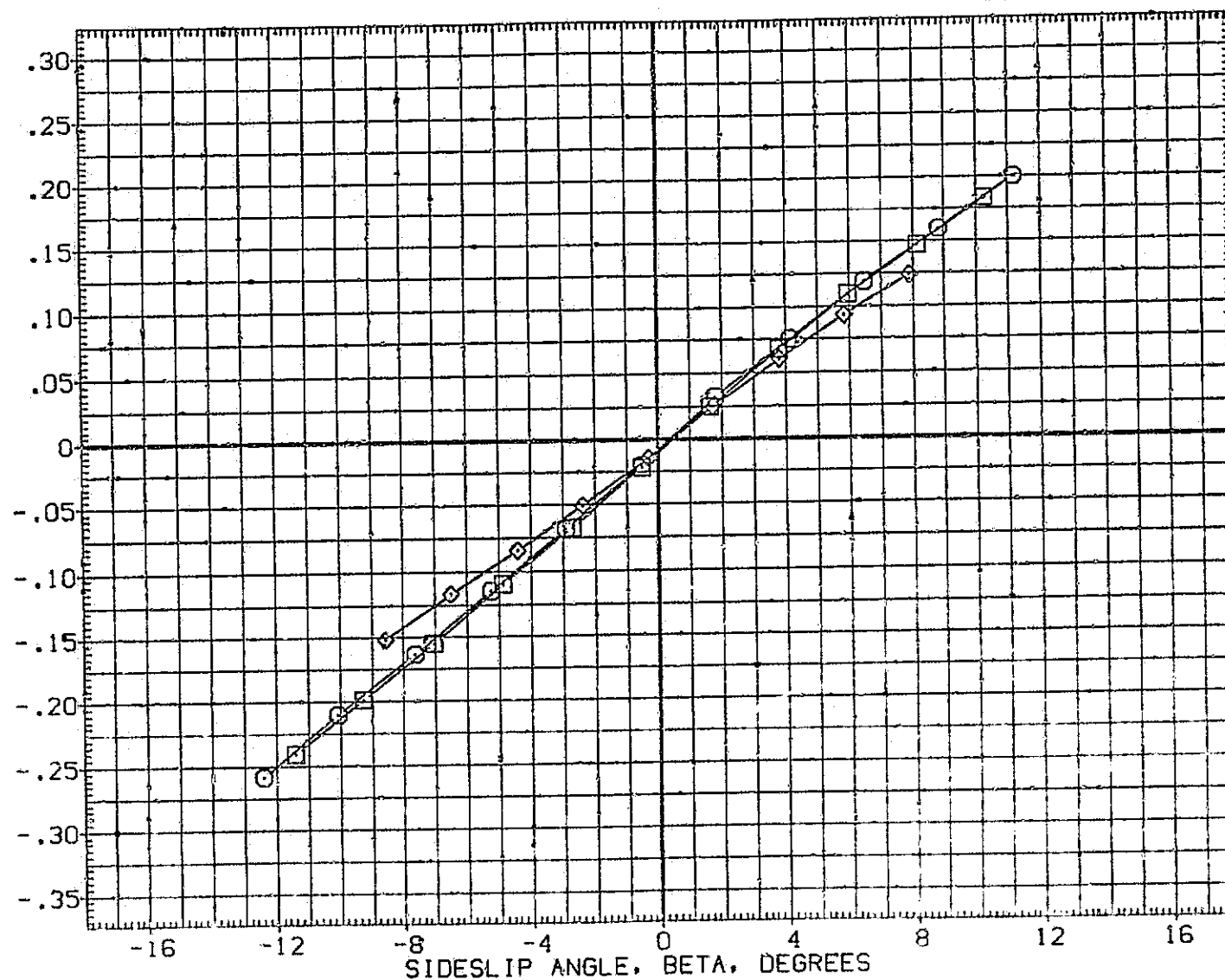


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
TAIC008	MSFC 594(A33) 740TS (TIP1SIP201) ORB STING
TAIC018	MSFC 594(A33) 740TS (TIP1SIP201) FORKED STING
TAIC030	MSFC 594(A33) 740TS (TIP1SIP201) FORKED STING

REFERENCE INFORMATION		
SRF	2690.0000	SG. FT
LRP	1290.0000	IN.
SRF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

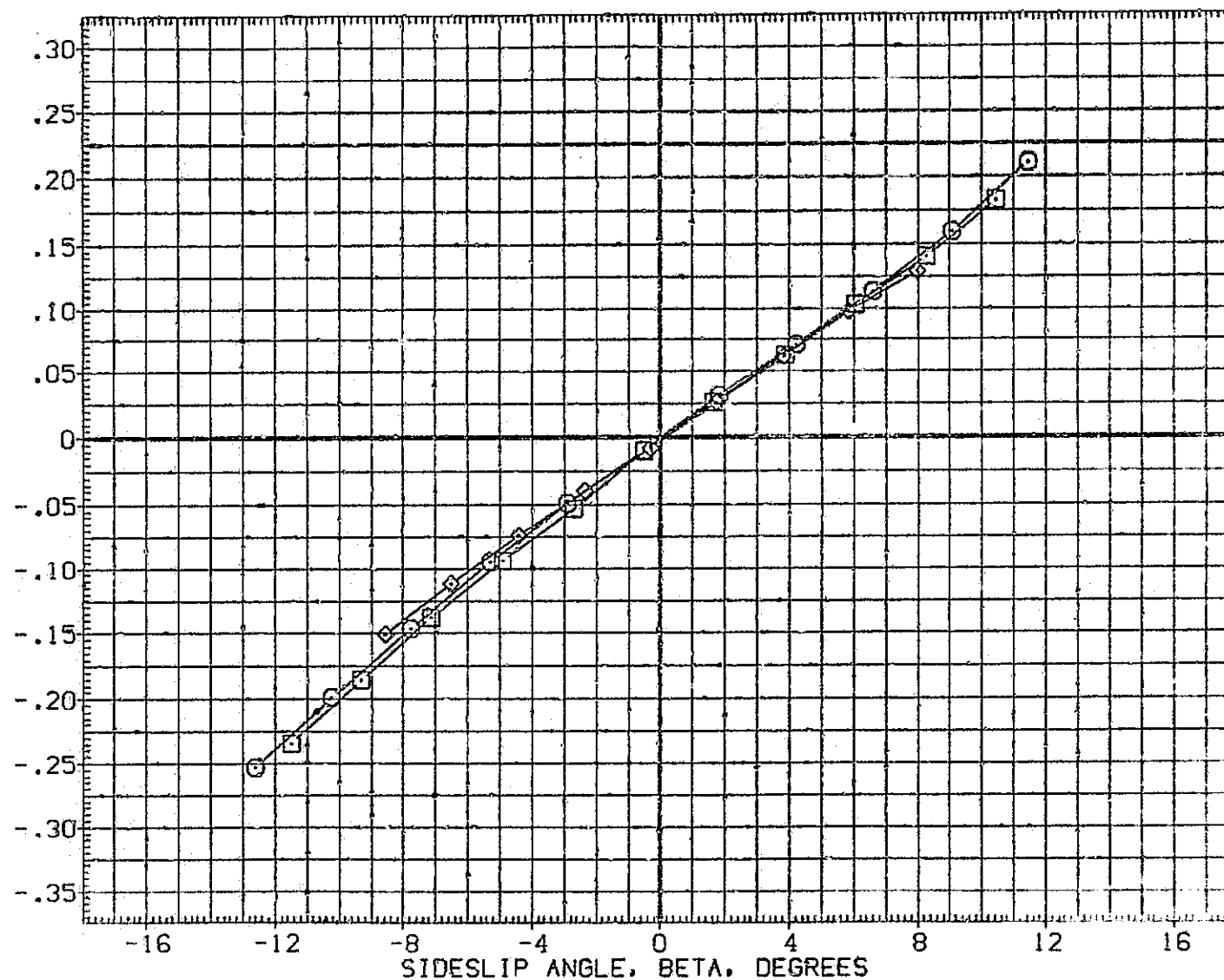


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(F)MACH = 1.25

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DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING

(A1C008)  MSFC 594(1A33) 740TS (TIP1G1P201)

(A1C018)  DATA NOT AVAILABLE

(A1C030)  DATA NOT AVAILABLE

REFERENCE INFORMATION

SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XM RP	976.0000	IN. XT
YM RP	.0000	IN. YT
ZM RP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

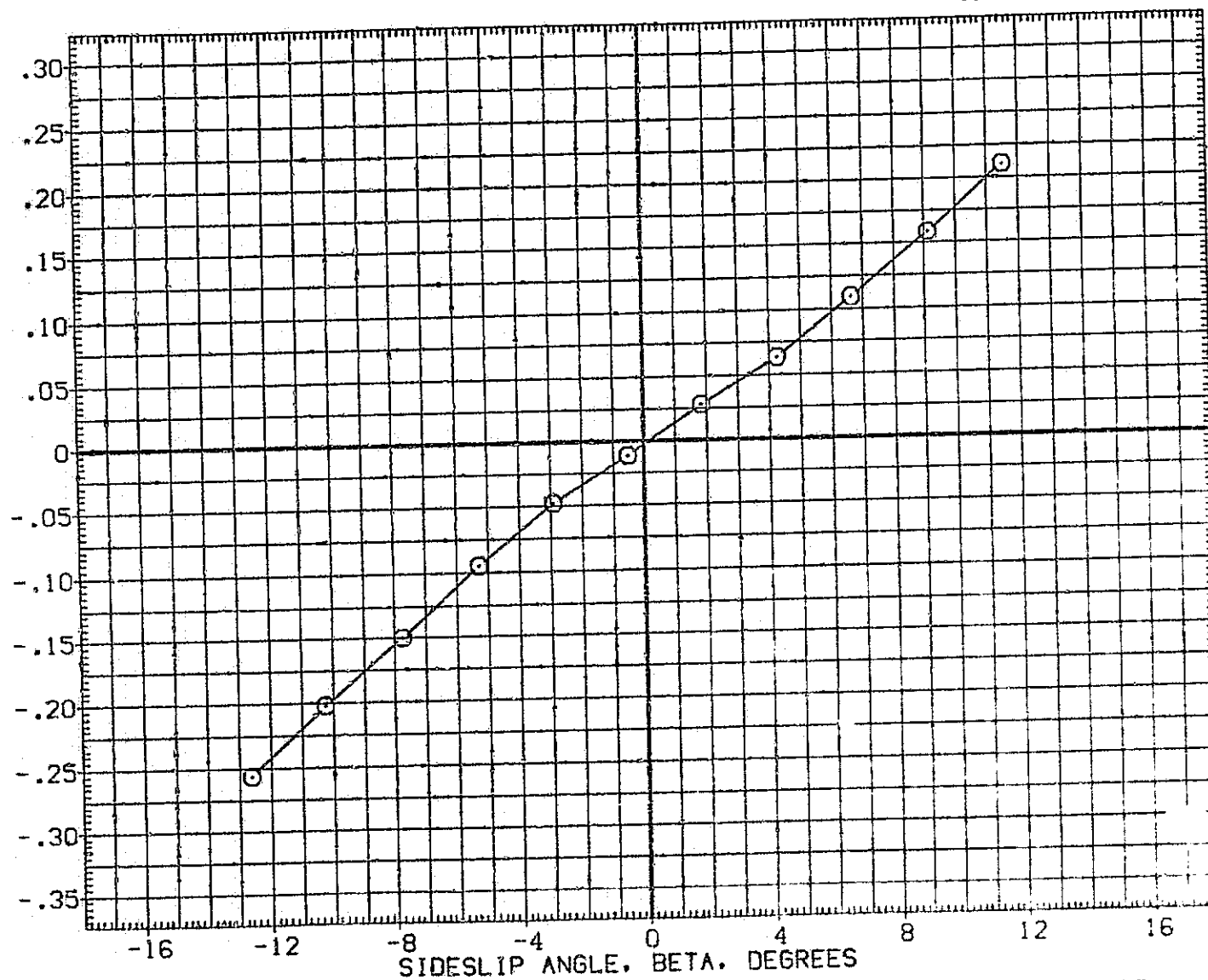


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(G)MACH = 1.47

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIG STING
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(AIC018)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(AIC030)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

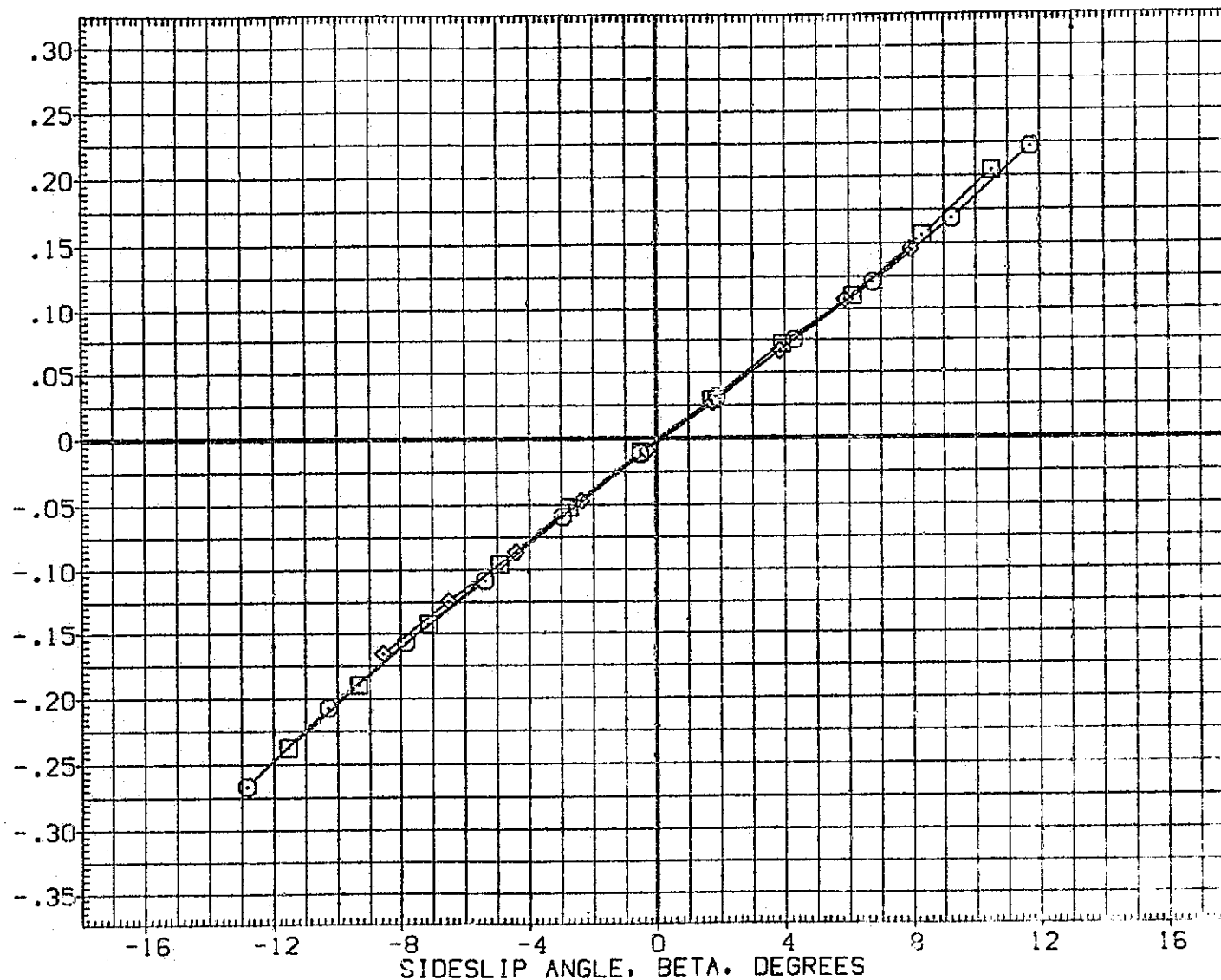


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(H)MACH = 1.97

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC S94(1A33) 740TS (TIPISIP201)	
(AIC018)	DATA NOT AVAILABLE	
(AIC030)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

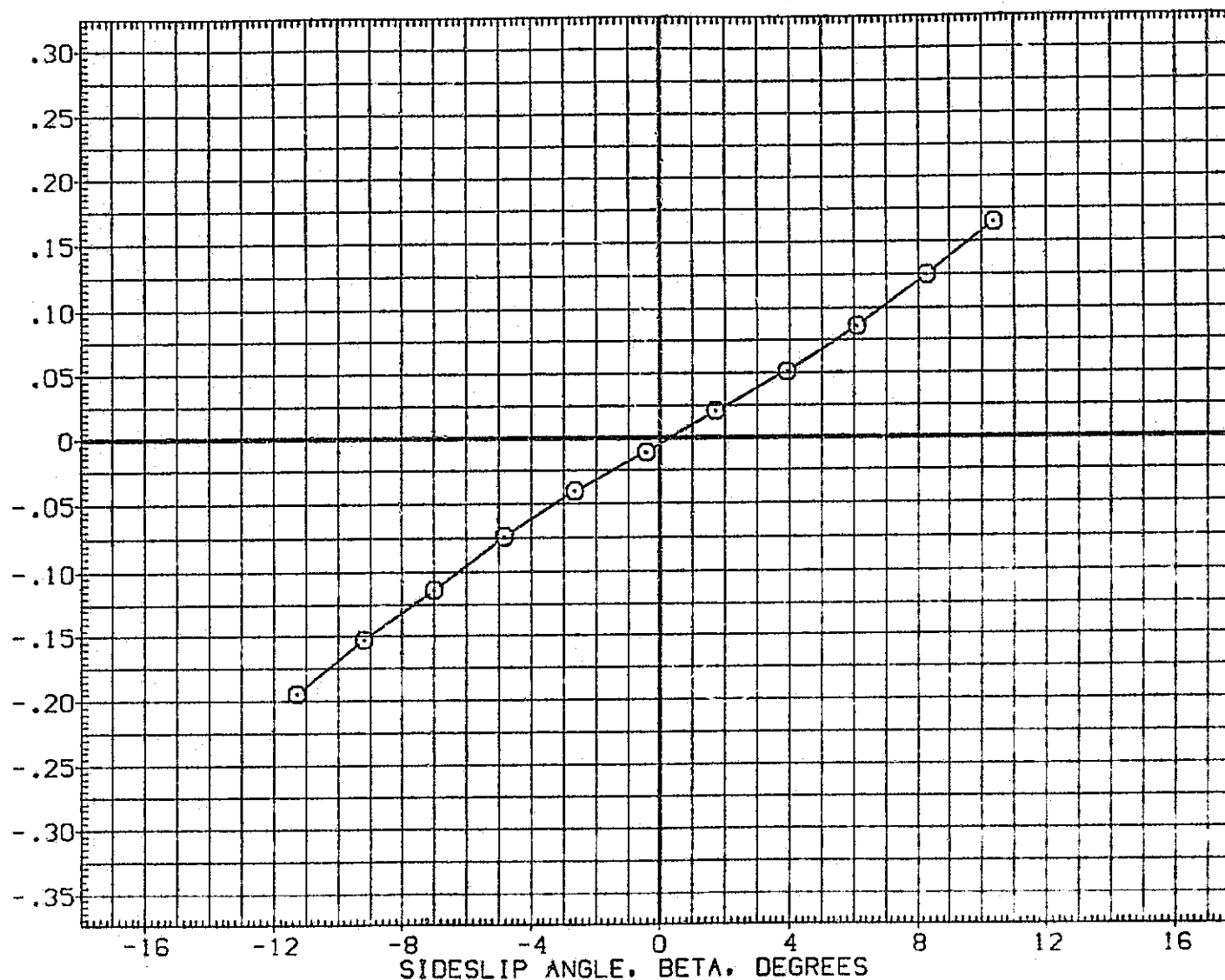





FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(1)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
[AIC008] 	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
[AIC018] 	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
[AIC030] 	DATA NOT AVAILABLE

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

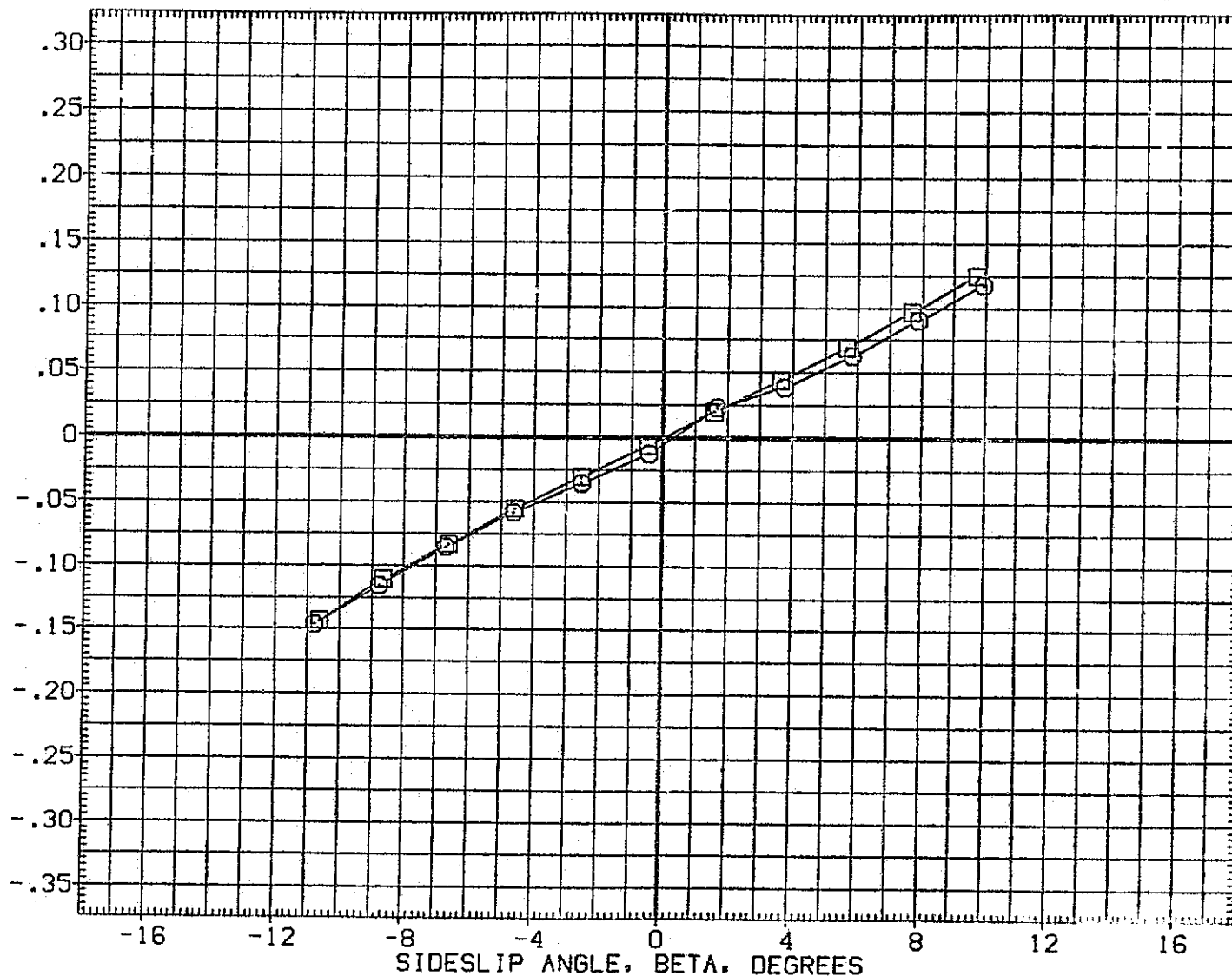


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008) □	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(AIC018) □	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(AIC030) ◇	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

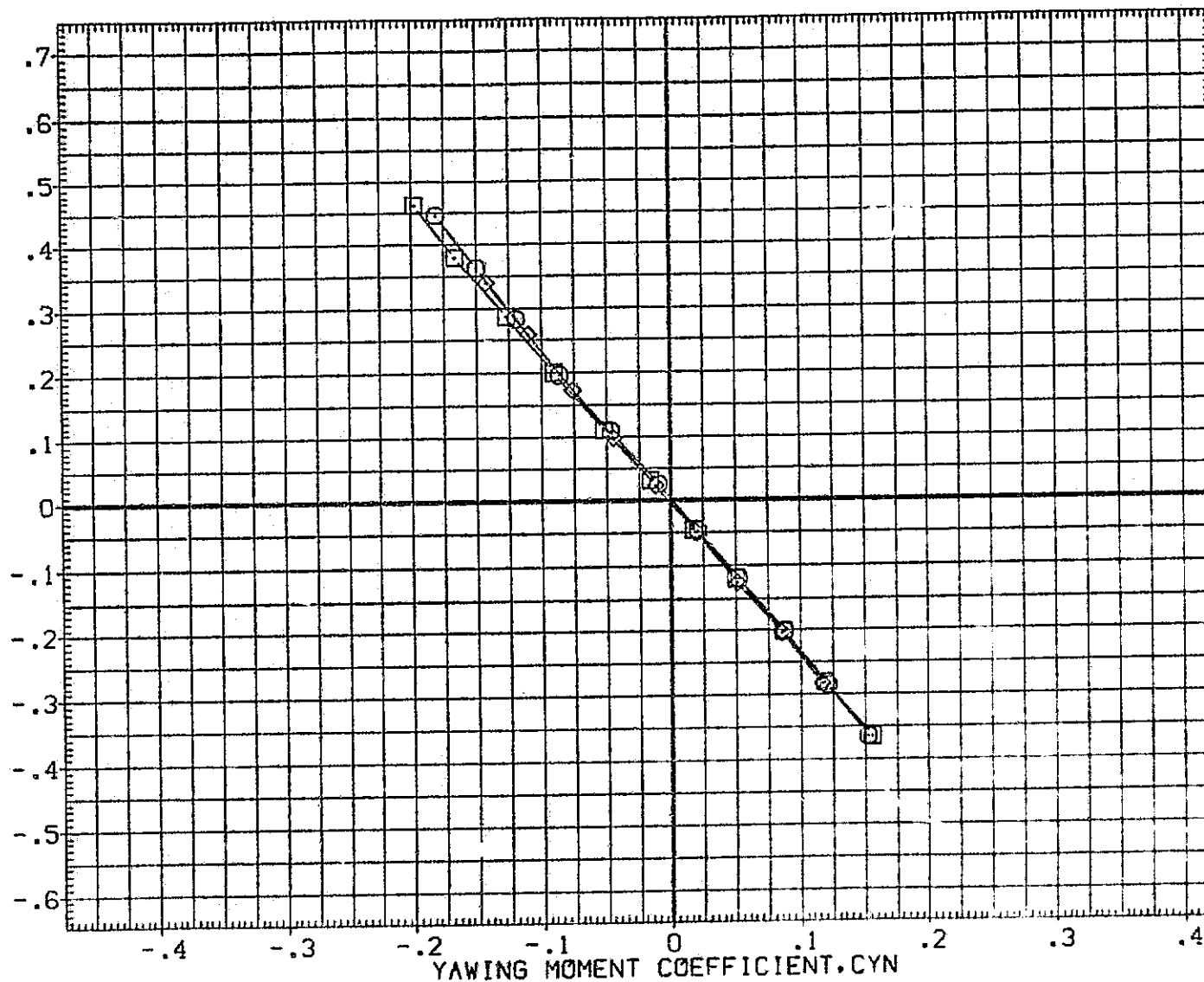


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
{AIC008}	MSFC S94(1A33) 740TS (TIPISIP201)	
{AIC018}	DATA NOT AVAILABLE	
{AIC030}	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

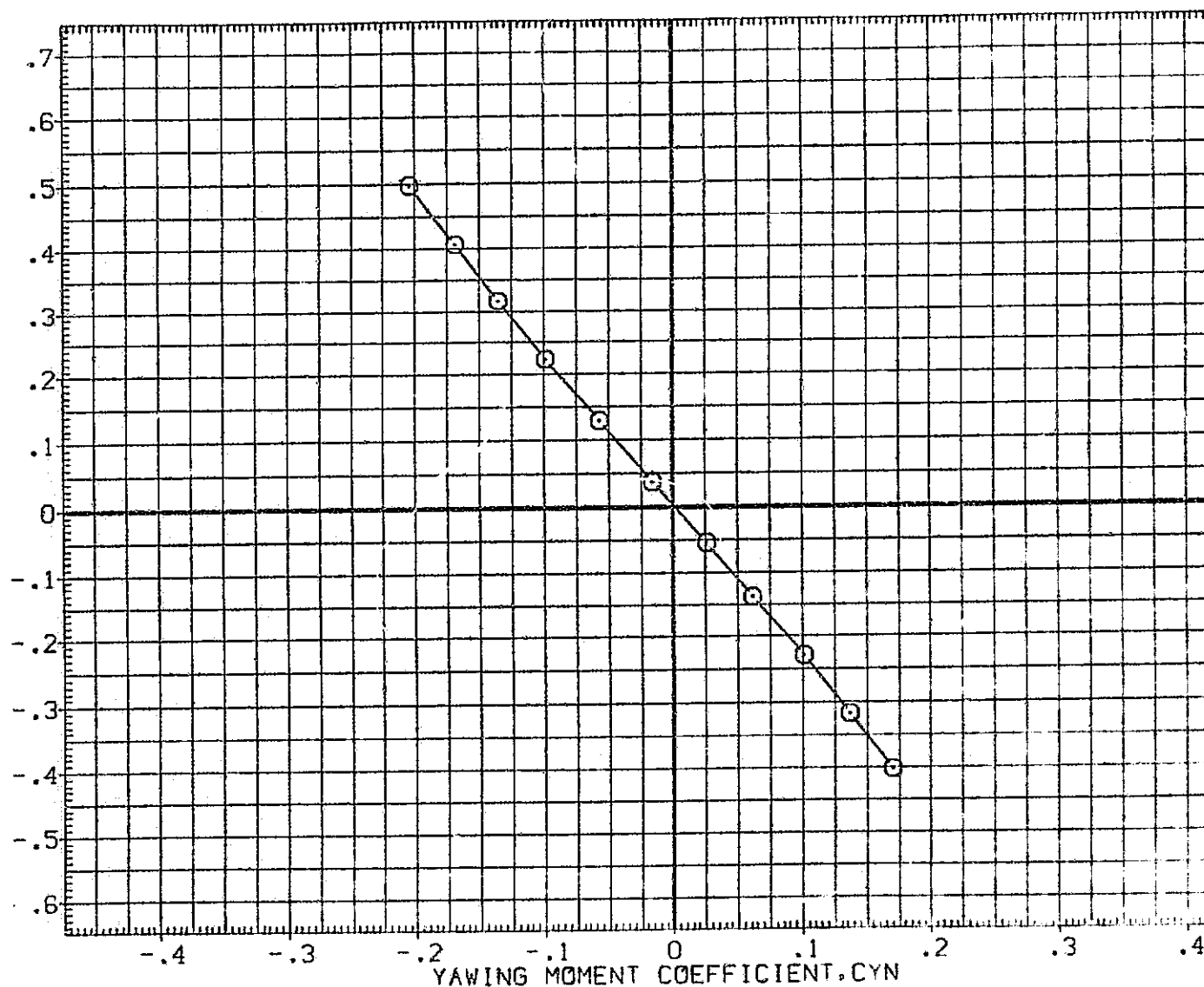


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(B)MACH = .80

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(A1C008) \square MSFC 594(1A33) 740TS (TIP1SIP201) ORB STING
 (A1C018) \square MSFC 594(1A33) 740TS (TIP1SIP201) FORKED STING
 (A1C030) \diamond MSFC 594(1A33) 740TS (TIP1SIP201) FORKED STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SIDE-FORCE COEFFICIENT, CY

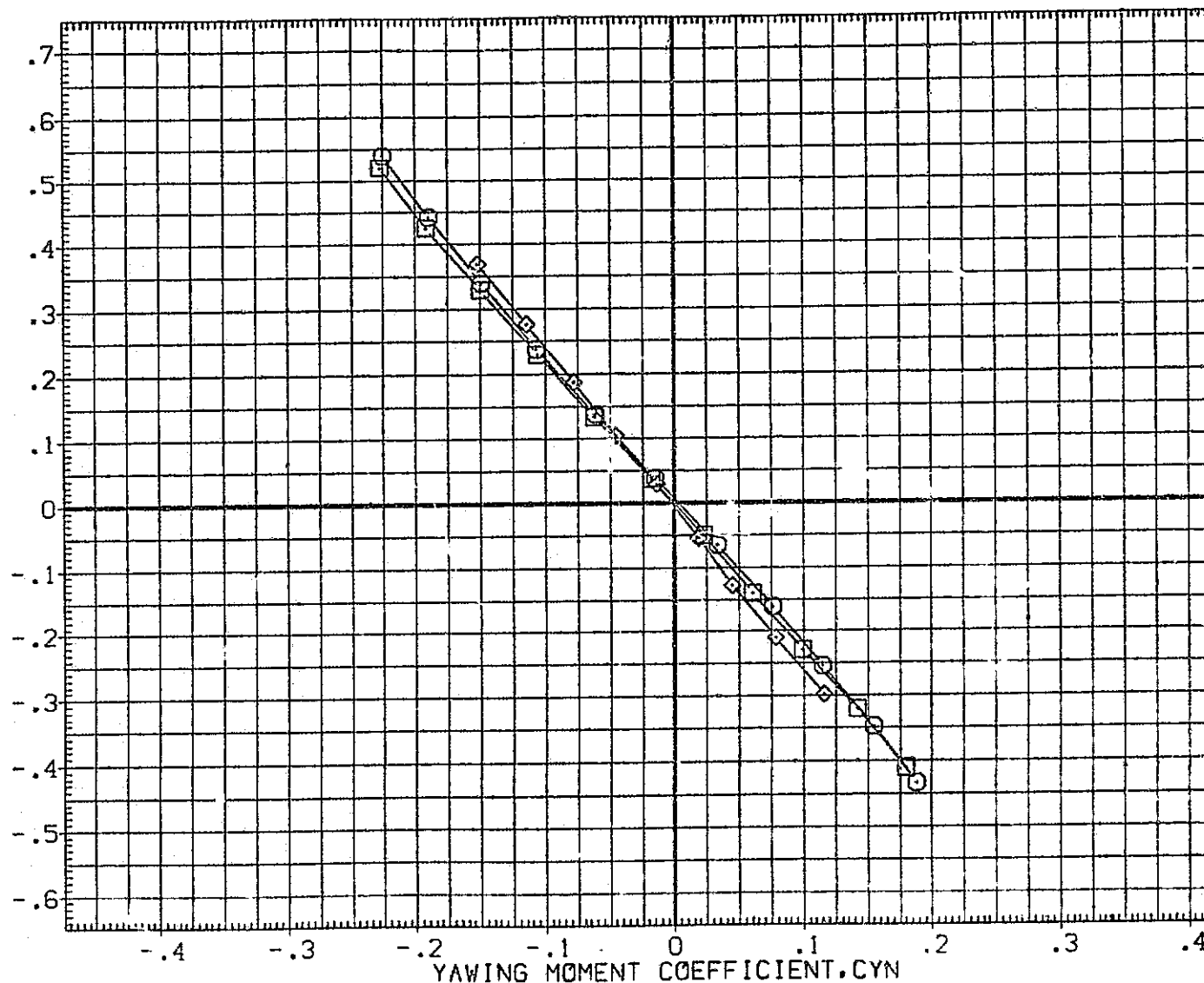


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIG STING
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORIG STING
(AIC018)	DATA NOT AVAILABLE	
(AIC030)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1293.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

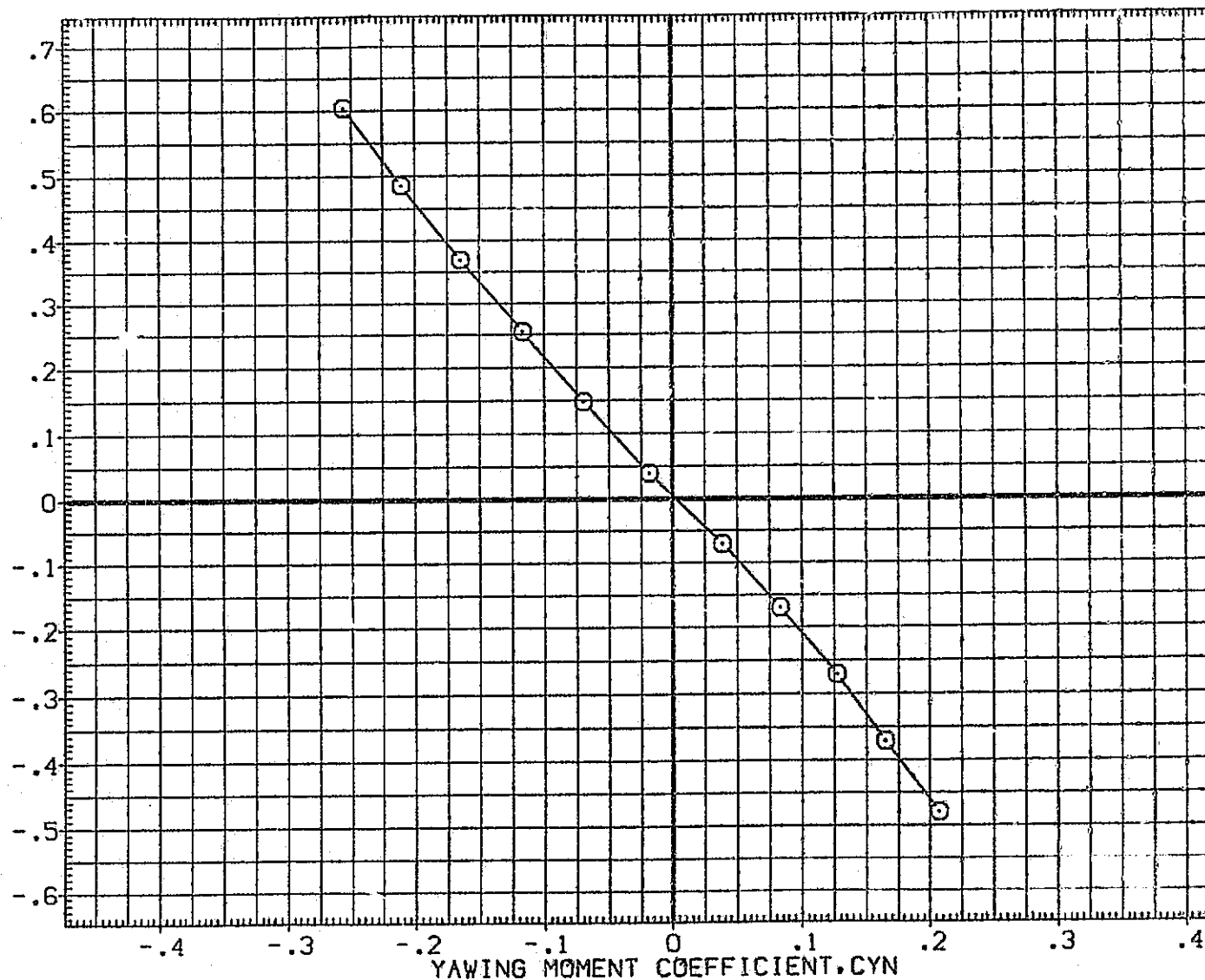


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(CD)MACH = 1.05

DATA SET SYMBOL CONFIGURATION DESCRIPTION

{AIC008}	○	MSFC S94(1A33) 740TS (TIPISIP201)	ORB STING
{AIC018}	□	MSFC S94(1A33) 740TS (TIPISIP201)	FORKED STING
{AIC030}	◇	MSFC S94(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION

SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

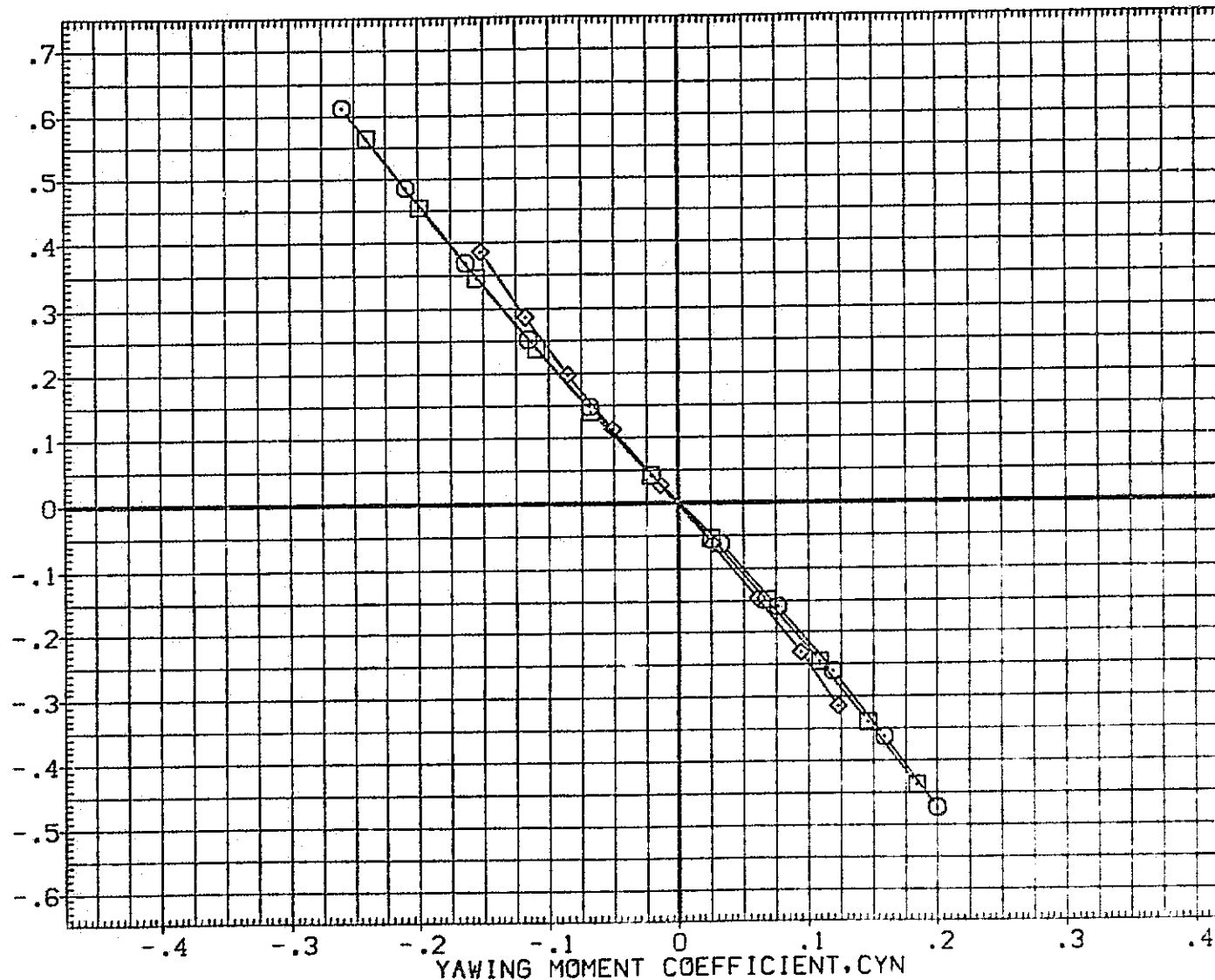


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC008)	MSFC 594 (A33) 740TS (TIP) SIP201 ORB STING
(AIC018)	MSFC 594 (A33) 740TS (TIP) SIP201 FORKED STING
(AIC030)	MSFC 594 (A33) 740TS (TIP) SIP201 FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

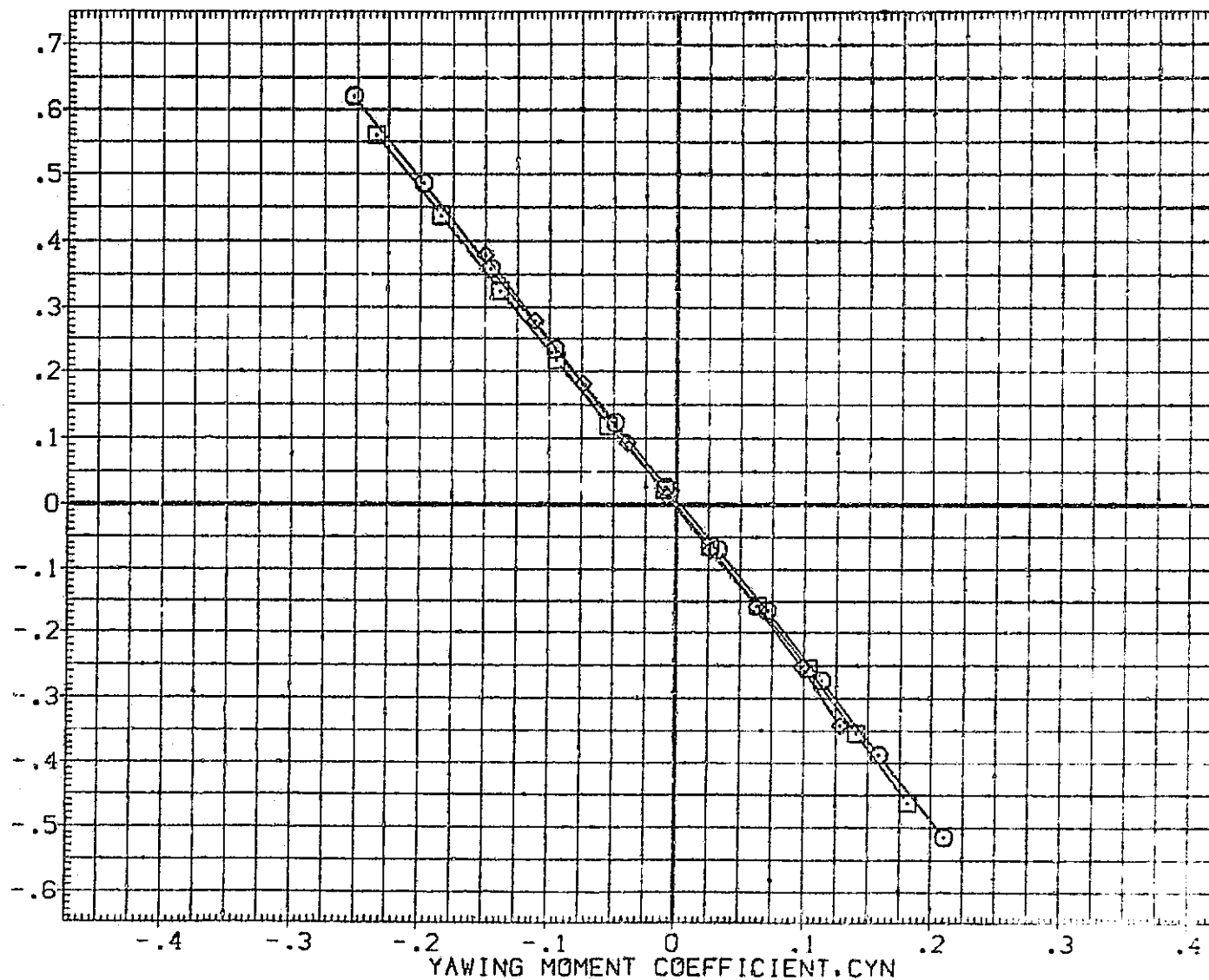





FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(F)MACH = 1.25

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING

(AIC008)  MSFC 594(1A33) 740TS (TIPISIP201)

(AIC018)  DATA NOT AVAILABLE

(AIC030)  DATA NOT AVAILABLE

REFERENCE INFORMATION

SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

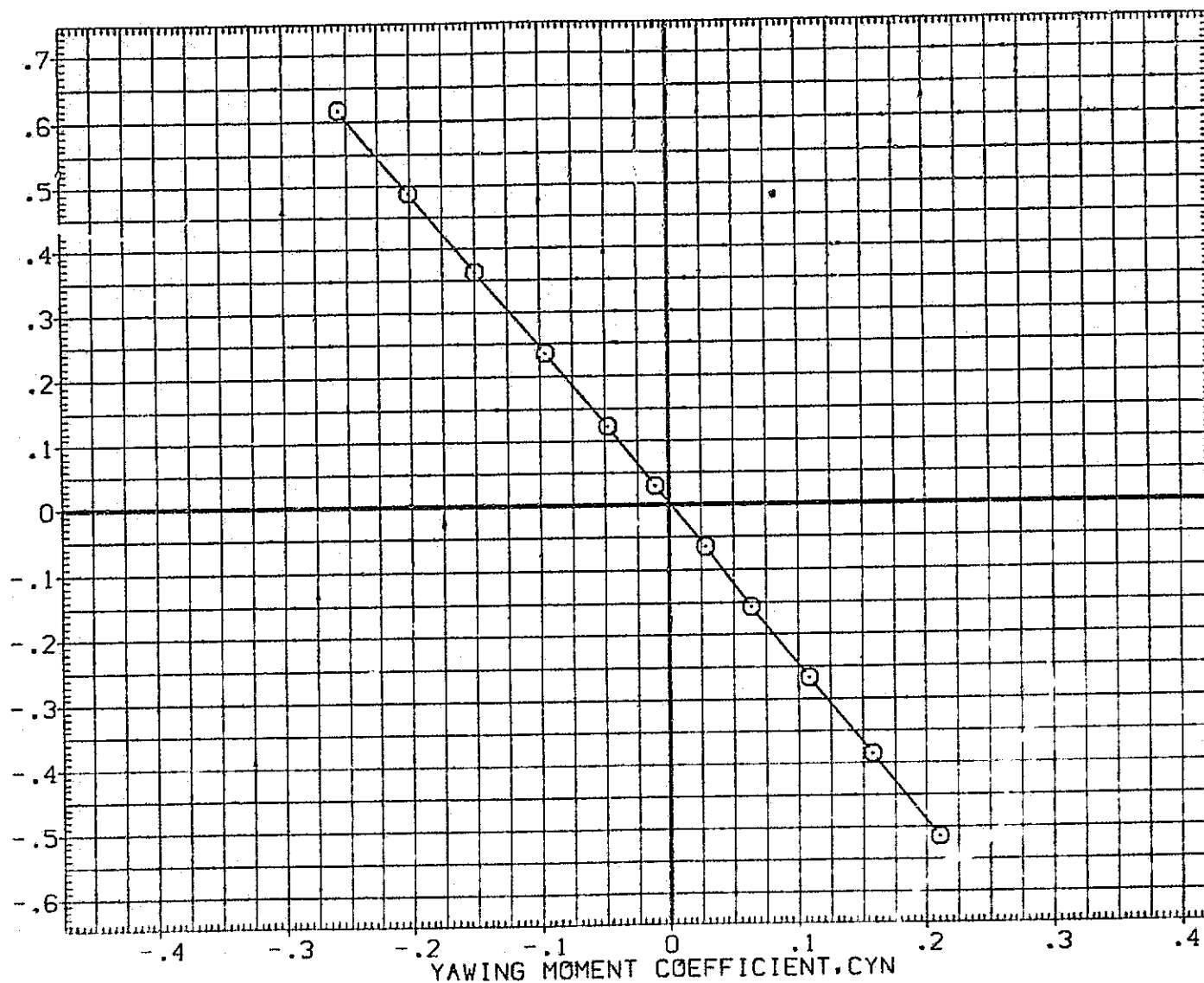


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(G)MACH = 1.47

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C008) ○	MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING
(A1C018) □	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING
(A1C030) ◇	MSFC 594(1A33) 740TS (T1P1S1P201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

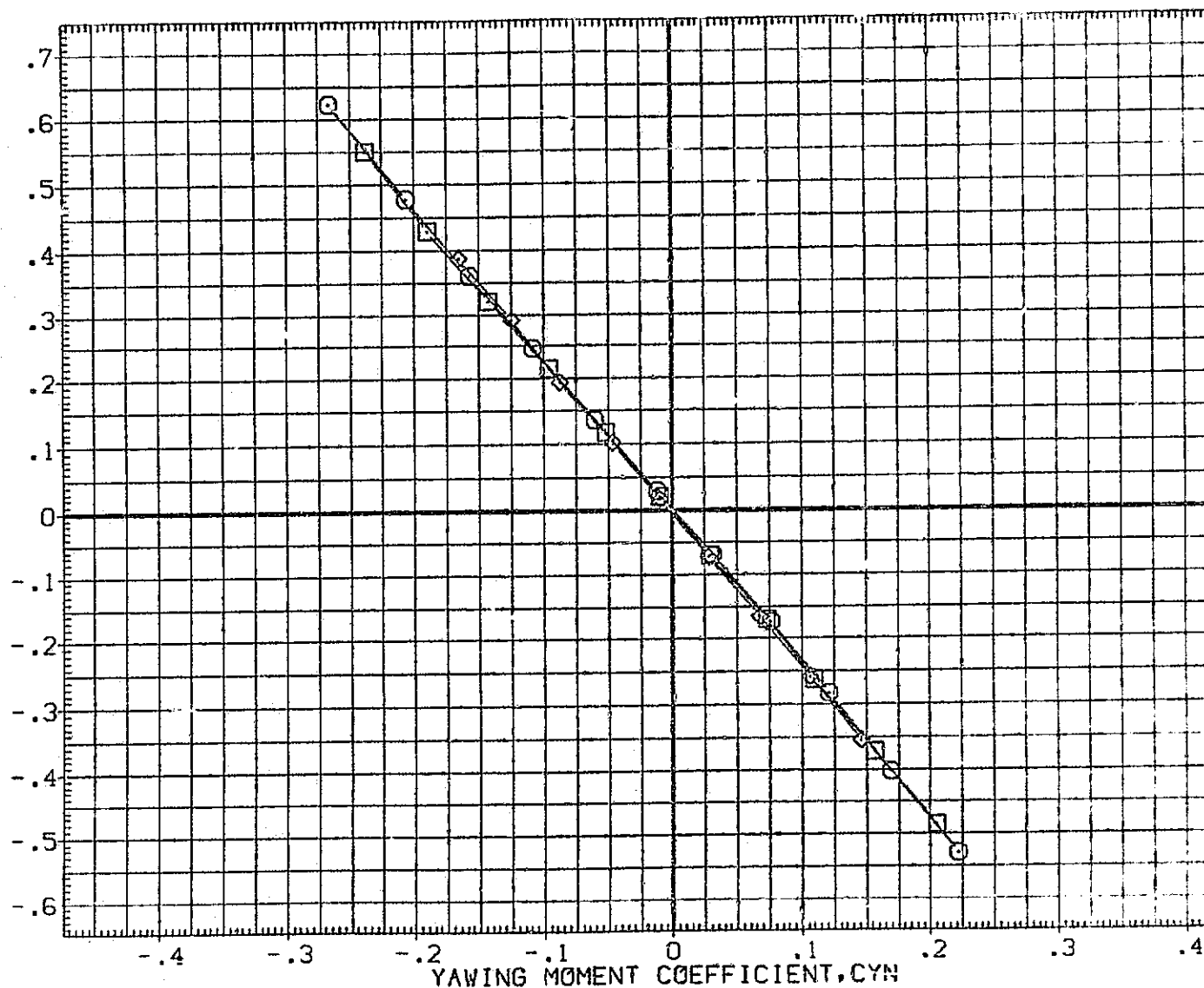


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(H)MACH - 1.97

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	
(AIC018)	DATA NOT AVAILABLE	
(AIC030)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

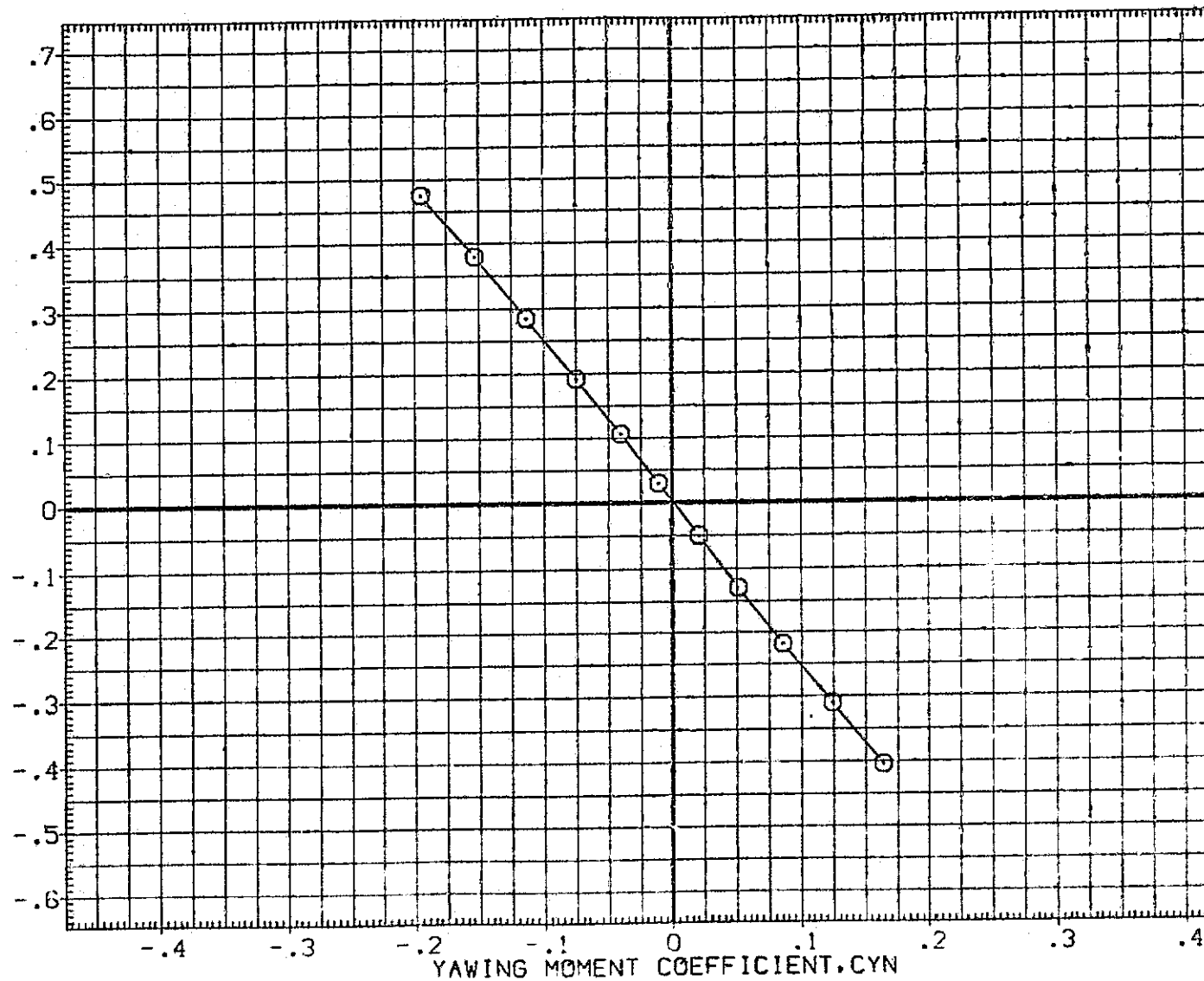


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
 (1) MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C008) □	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(A1C018) □	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(A1C030) ◇	DATA NOT AVAILABLE

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

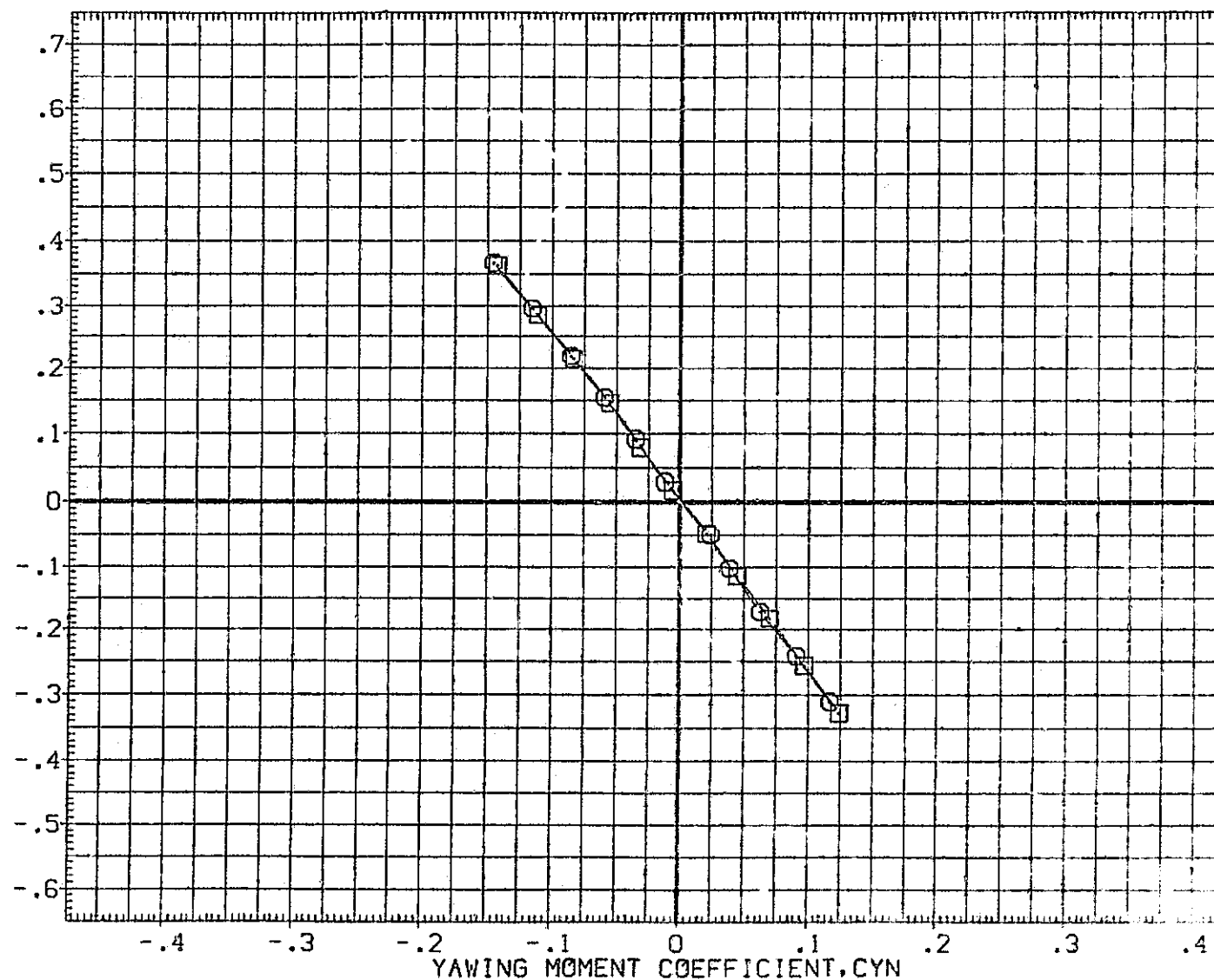


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(WIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	DRB STING
(WIC030)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(WIC018)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

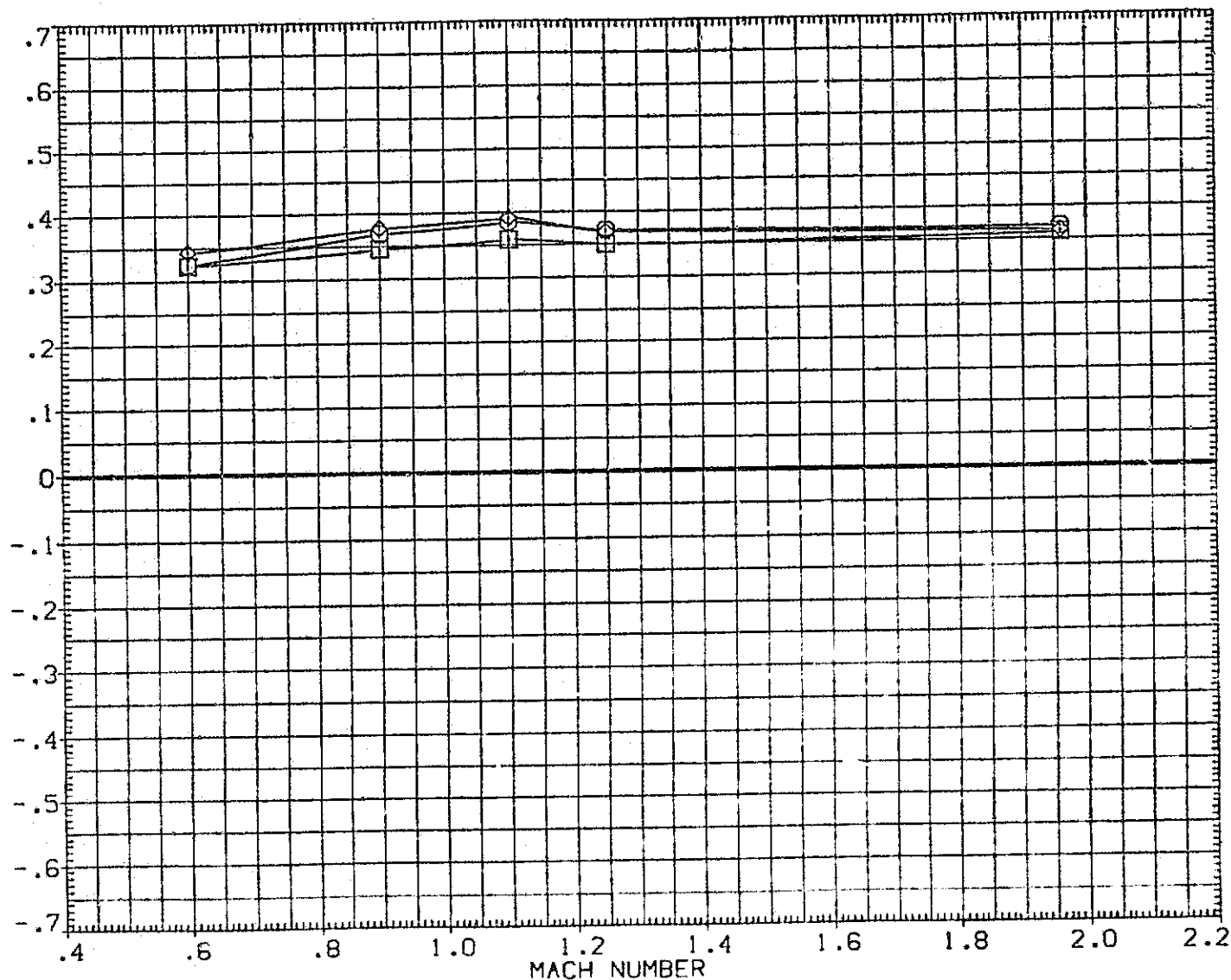


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(A) BETA = -8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008) ○	MSFC S94(A33) 740TS (TIP)SIP201) ORB STING
(VIC030) □	MSFC S94(A33) 740TS (TIP)SIP201) FORKED STING
(VIC018) ◇	MSFC S94(A33) 740TS (TIP)SIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. YT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

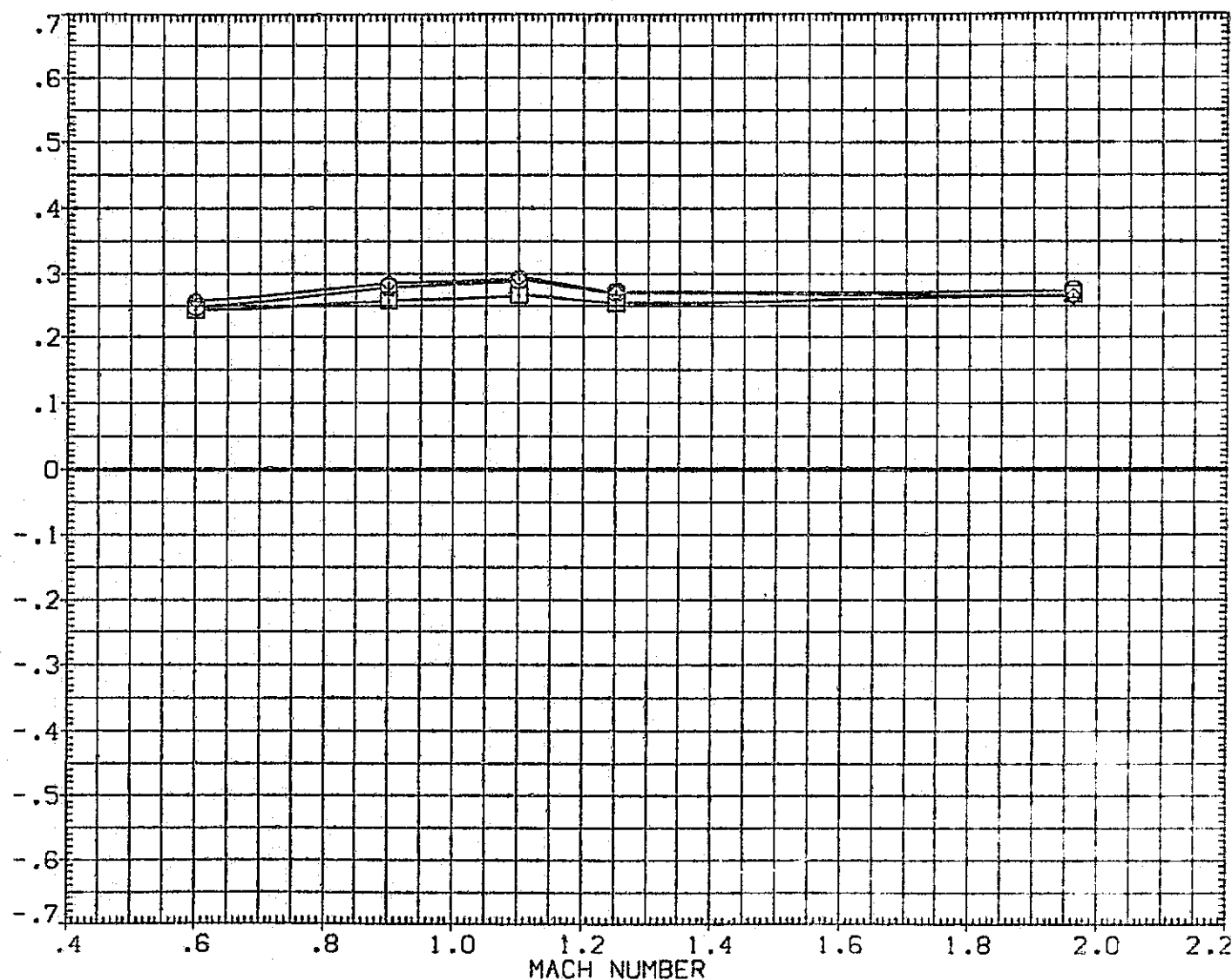


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(B) BETA = -6.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC008)	○	MSFC S94(A33) 740TS (TIPISIP201)	ORB STING
(VIC030)	□	MSFC S94(A33) 740TS (TIPISIP201)	FORKED STING
(VIC018)	◇	MSFC S94(A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

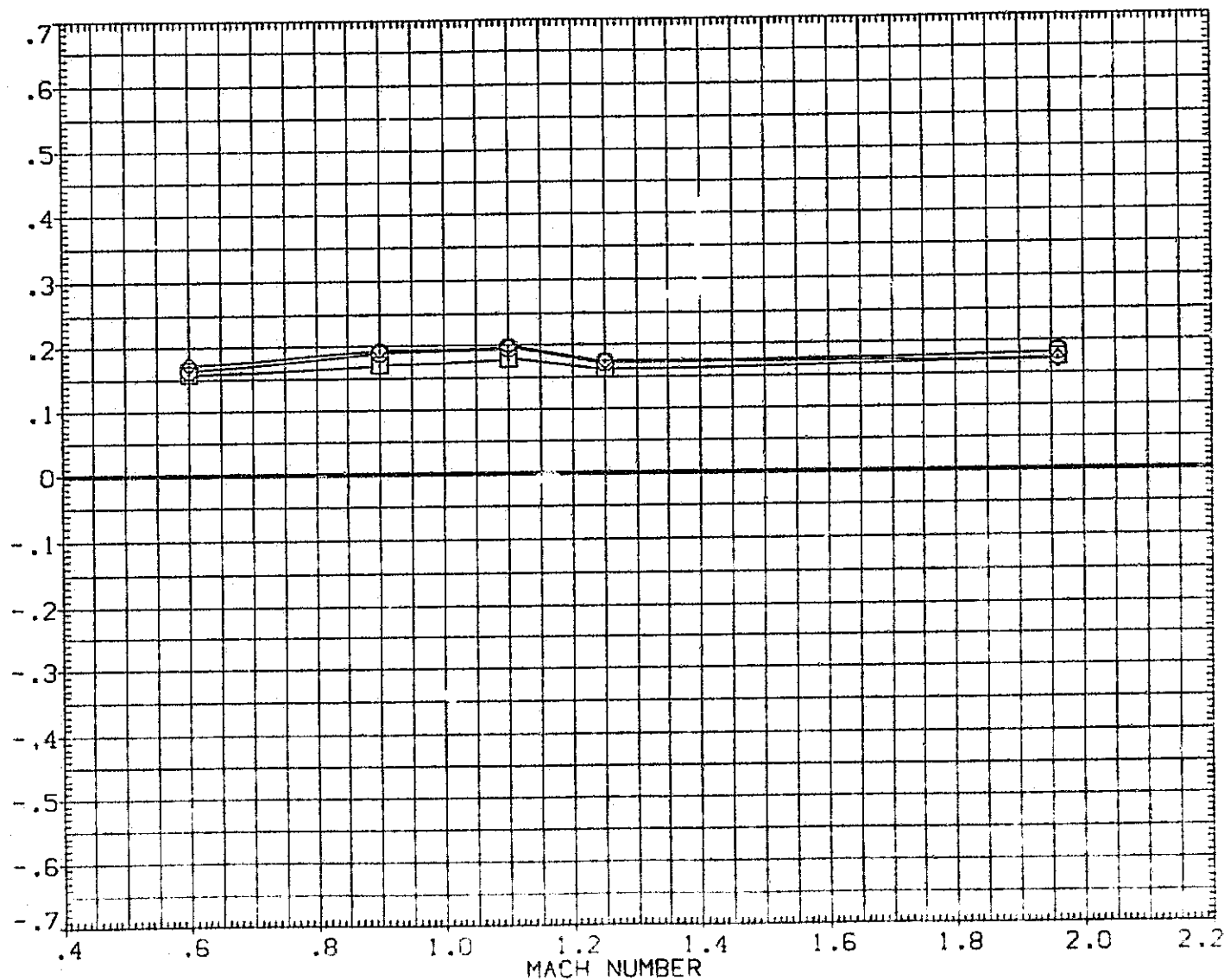


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(C)BETA = -4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC030)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC018)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	N.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

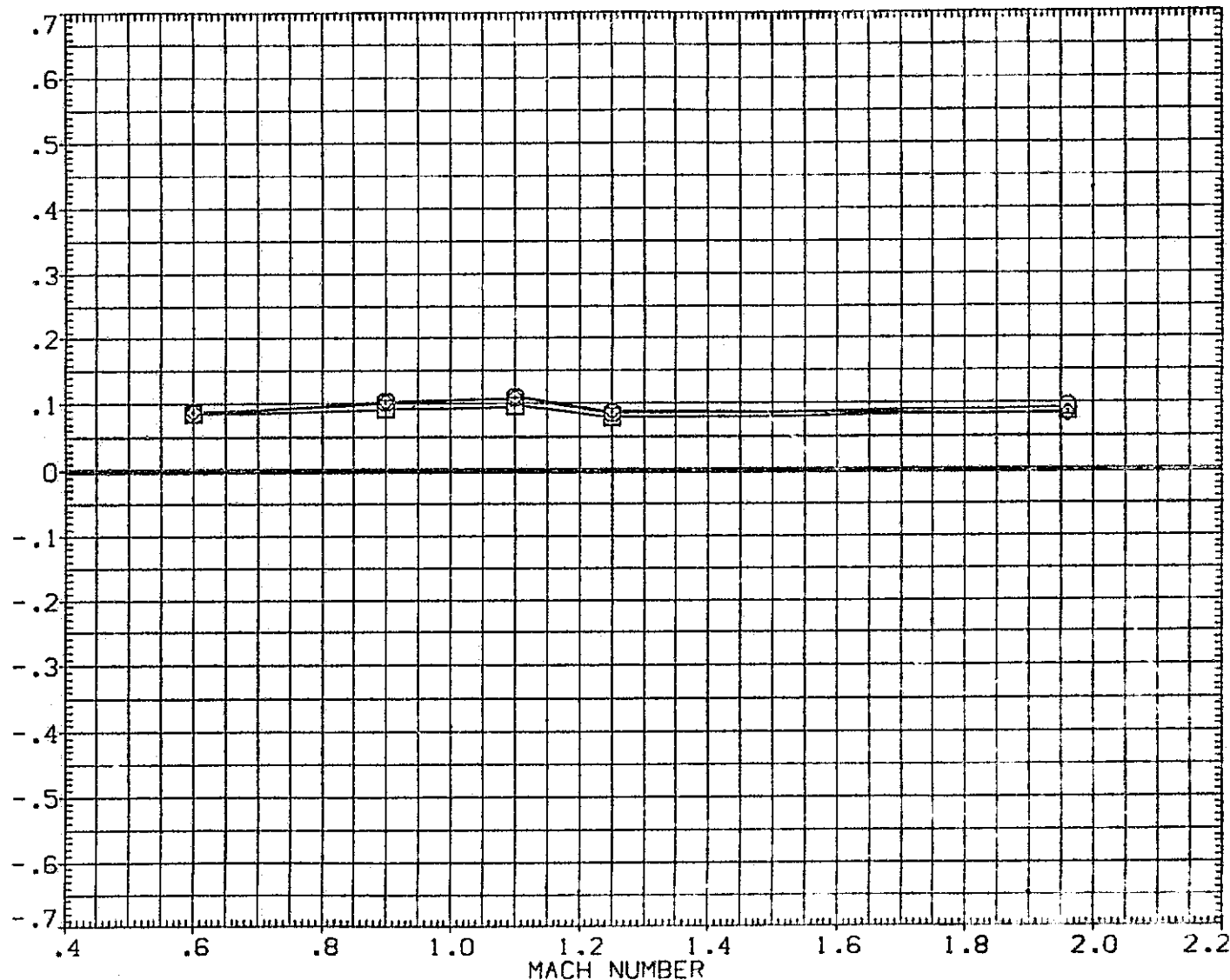


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(D)BETA = -2.00

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008) ○	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC030) ○	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC018) ◇	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

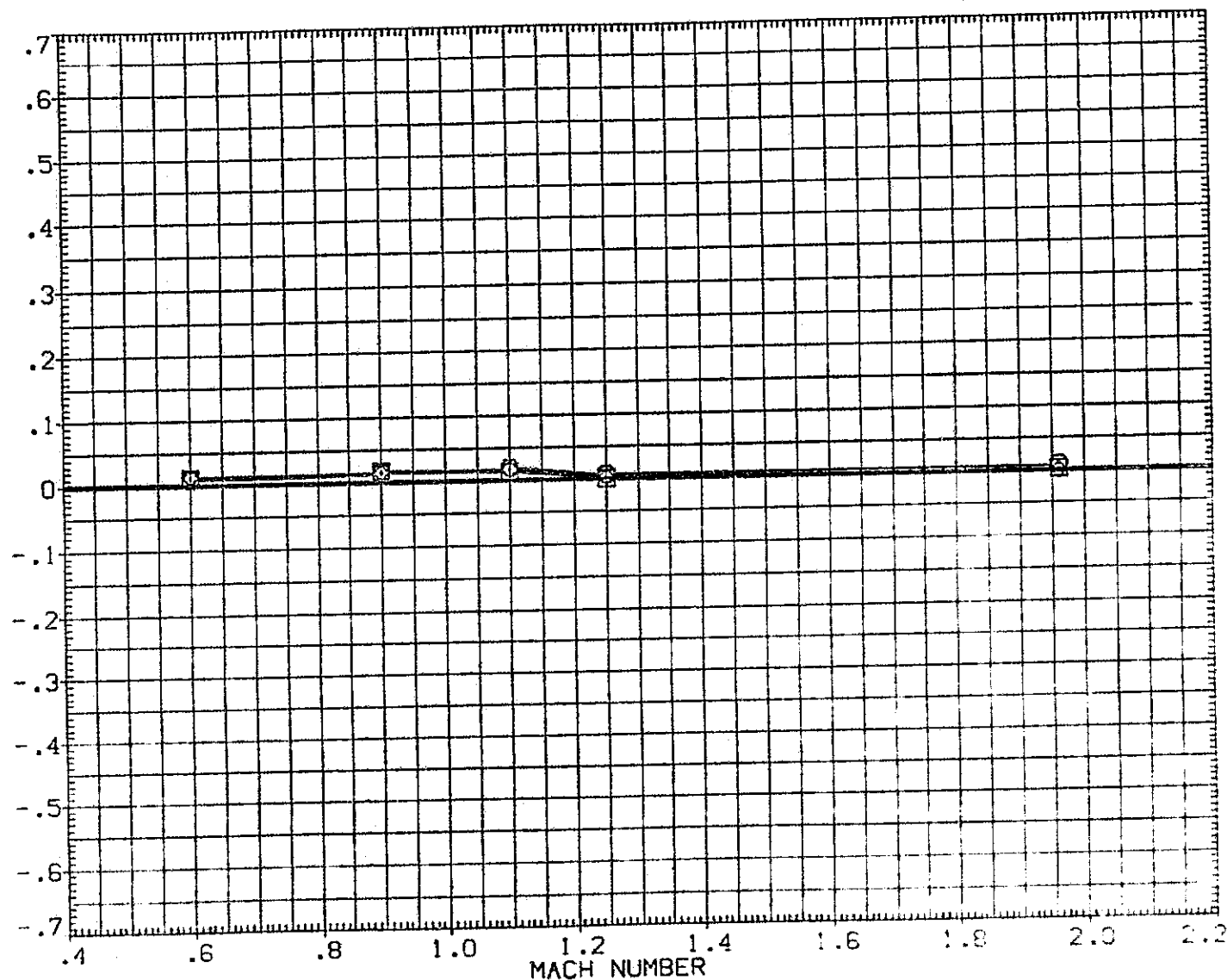


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(E)BETA = .00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIGIN
(VIC008)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING
(VIC030)	MSFC 594(A33) 740TS (TIPISIP201)	FORKED STING
(VIC018)	MSFC 594(A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

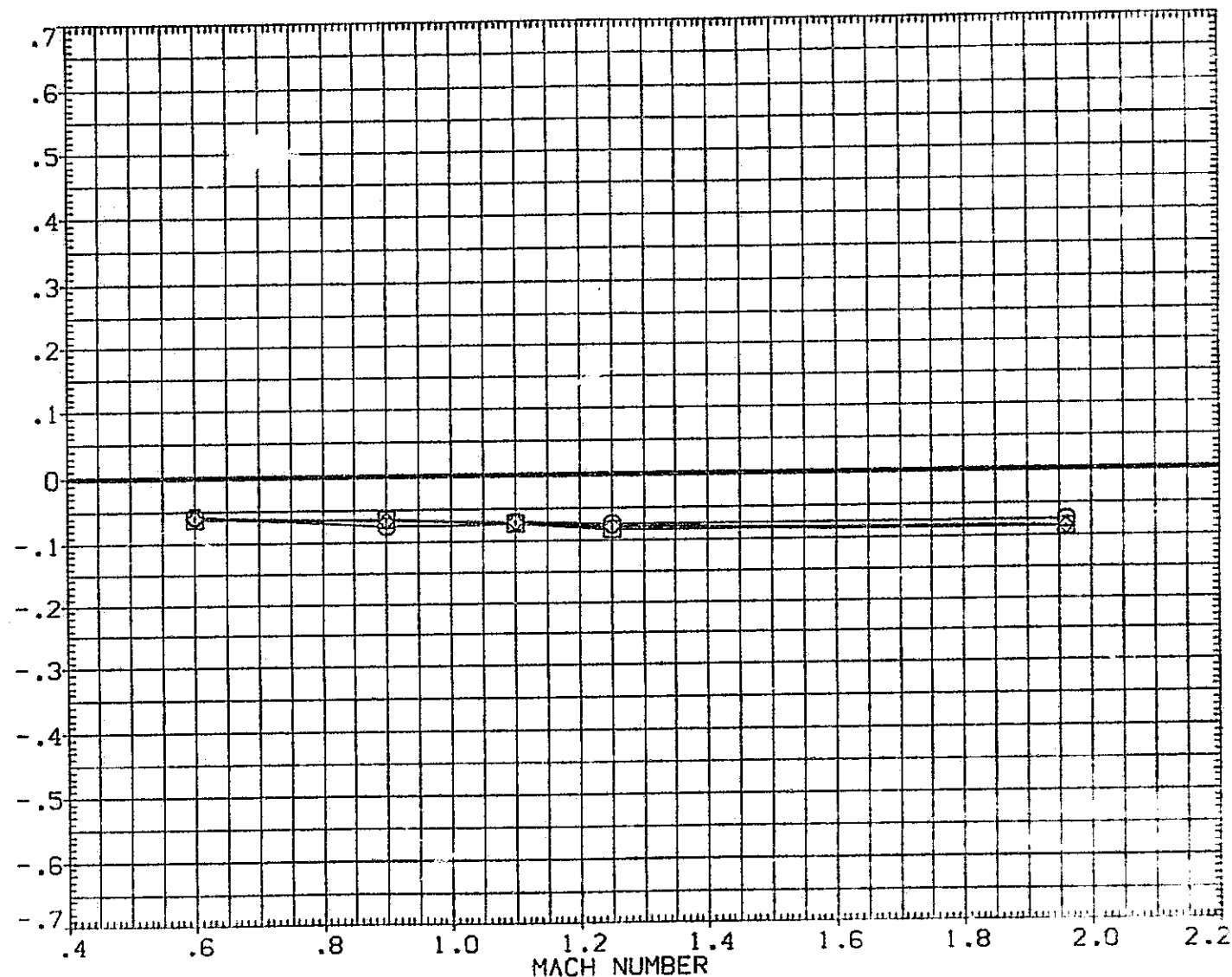


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(F)BETA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(WIC008)	MSFC 594(1A33) 740TS (T:PISIP201) ORB STING
(VIC030)	MSFC 594(1A33) 740TS (T:PISIP201) FORKED STING
(VIC018)	MSFC 594(1A33) 740TS (T:PISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

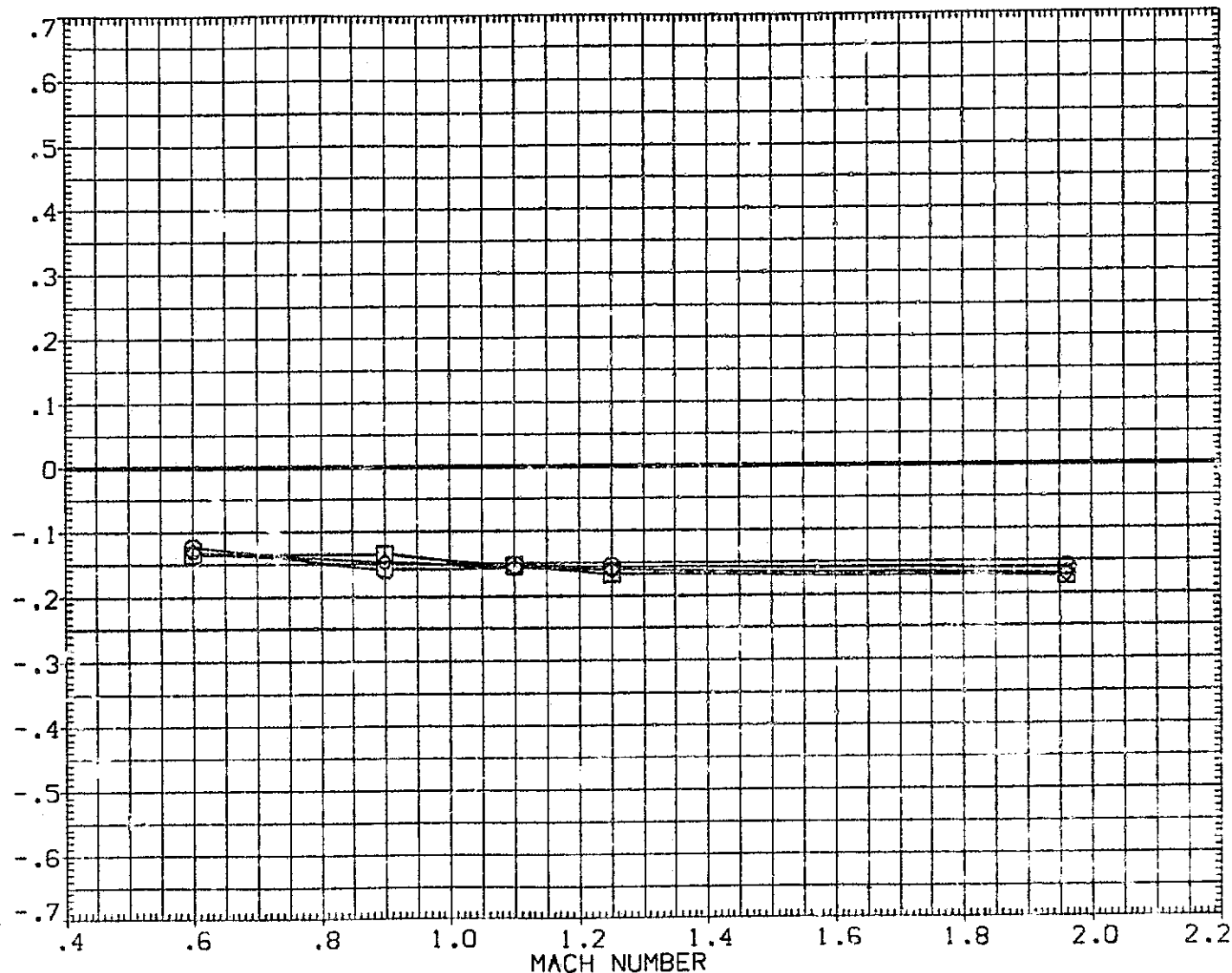


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(G)BETA = 4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VICO08)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VICO30)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(VICO18)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

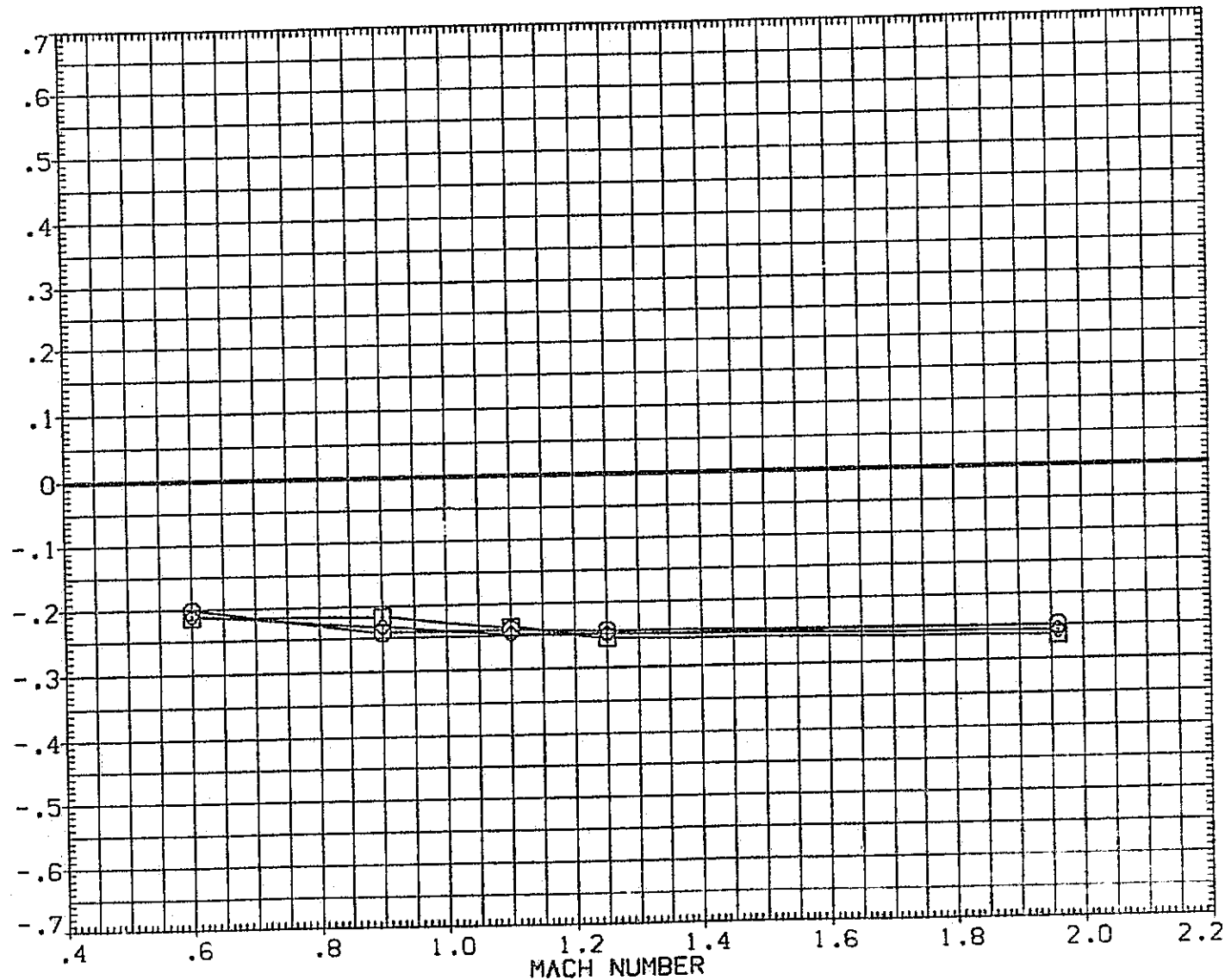


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(H)BETA = 6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(WIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VIC030)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(WIC018)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

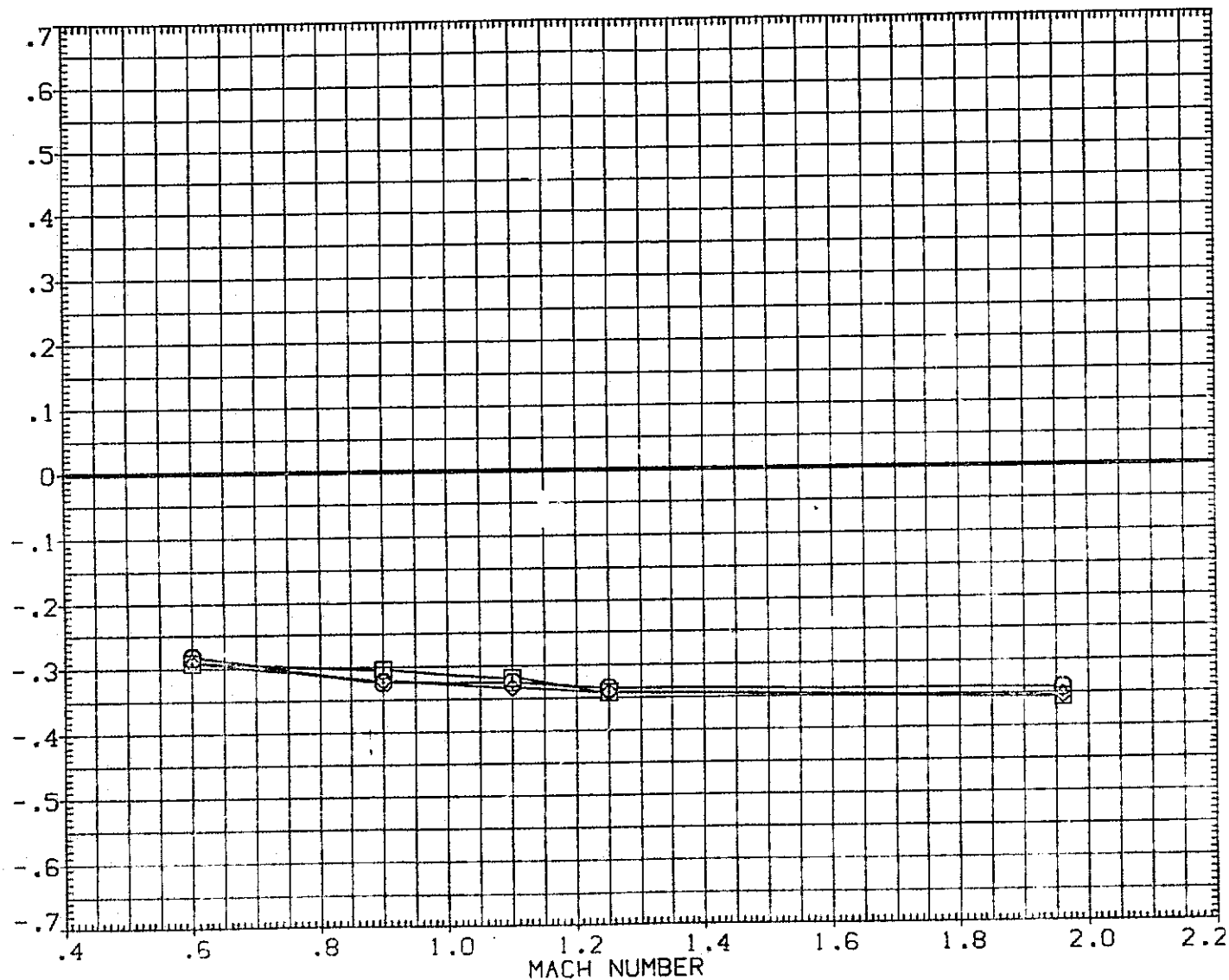


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(I)BETA = 8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	STING
(WIC008)	MSFC S94(1A33) 740TS (TIP)SIP201	ORB STING
(VIC030)	MSFC S94(1A33) 740TS (TIP)SIP201	FORKED STING
(VIC018)	MSFC S94(1A33) 740TS (TIP)SIP201	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	978.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

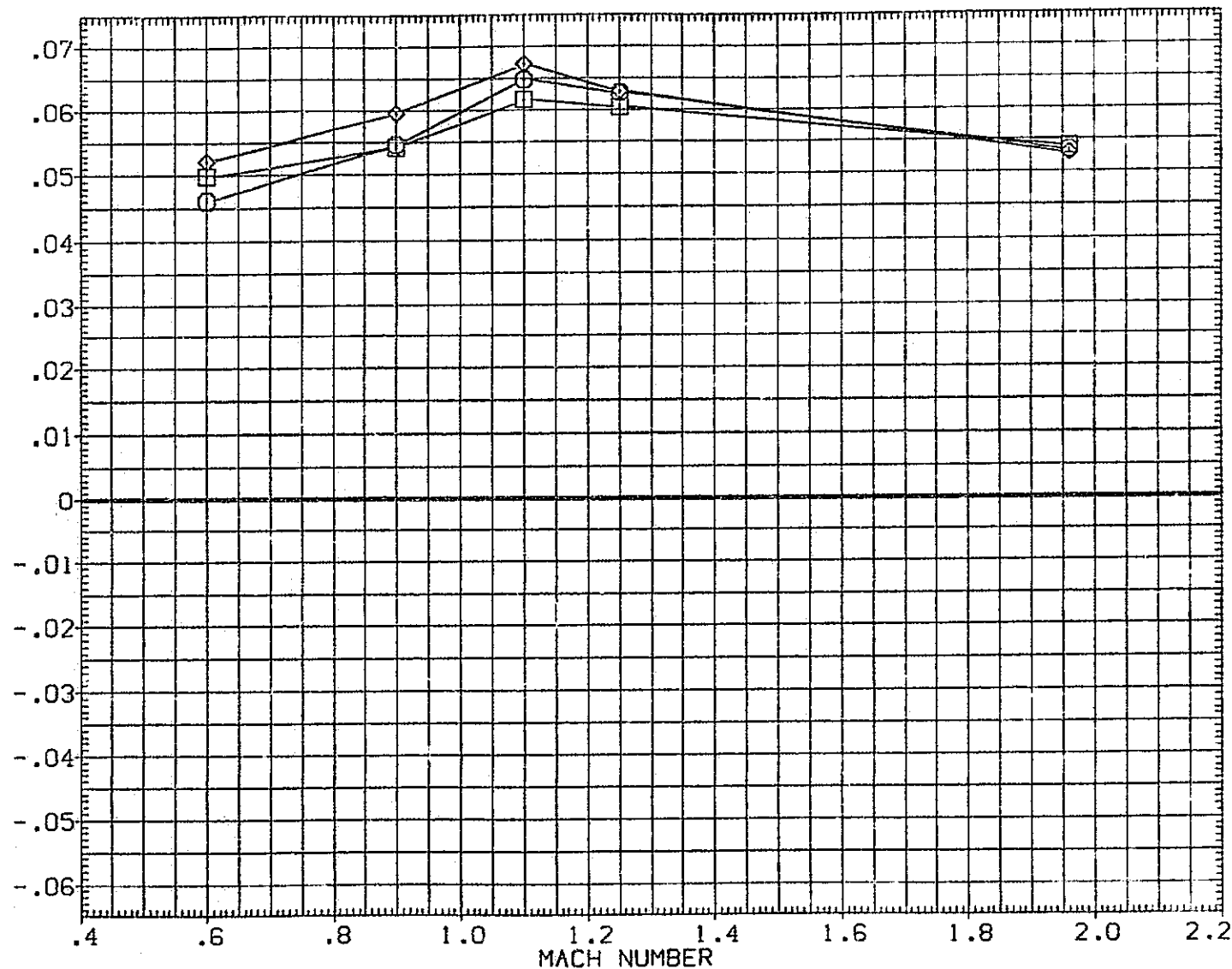


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(A) BETA = -8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIG STING
(VIC008)	MSFC 594(A33) 740TS (TIPISIP201)	ORIG STING
(VIC030)	MSFC 594(A33) 740TS (TIPISIP201)	FORKED STING
(VIC018)	MSFC 594(A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

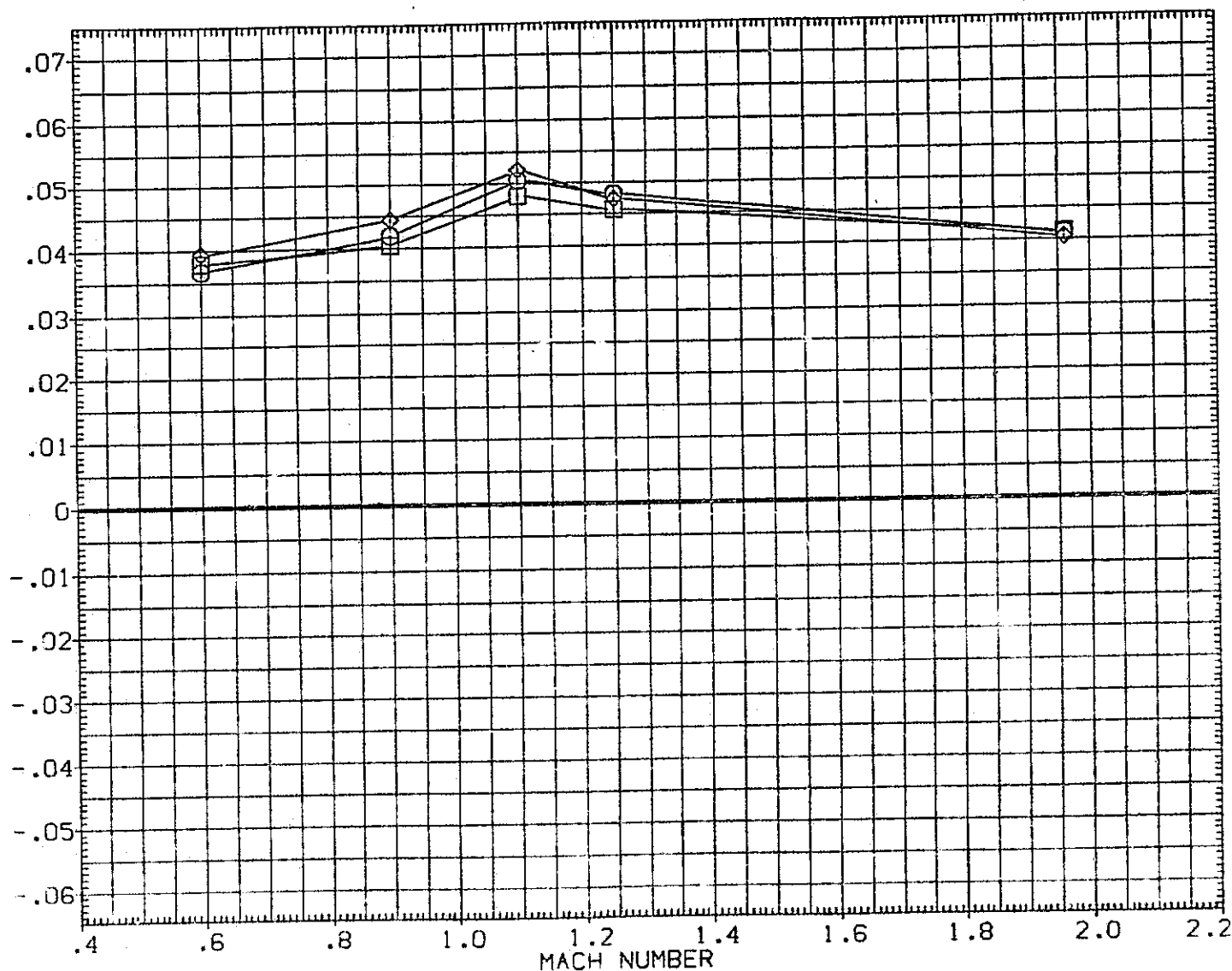


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(B) BETA = -6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIG STING
(V1C008)	MSFC S94(1A33) 740TS (TIP)SIP201	ORIG STING
(V1C030)	MSFC S94(1A33) 740TS (TIP)SIP201	FORKED STING
(V1C018)	MSFC S94(1A33) 740TS (TIP)SIP201	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

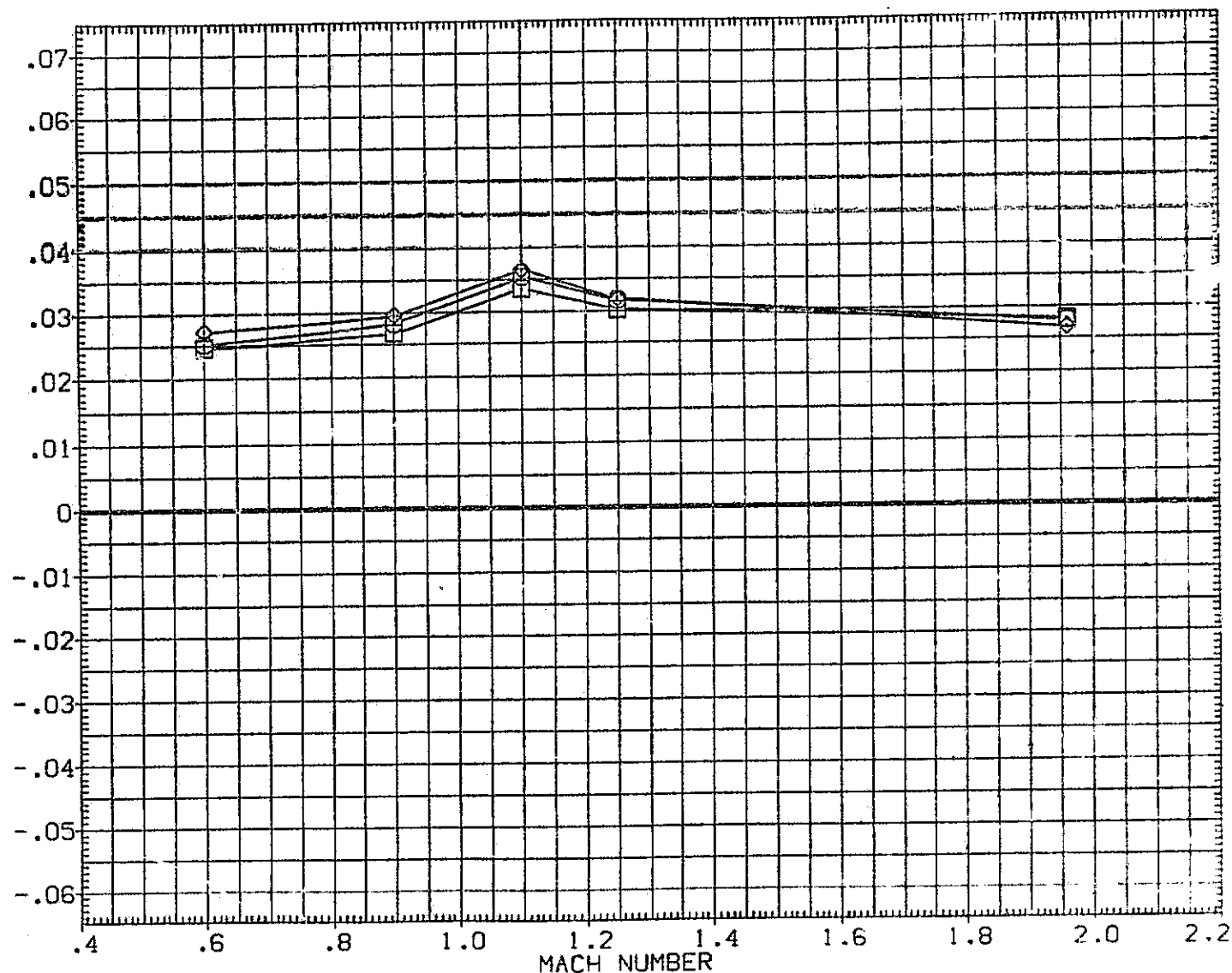


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(C)BETA = -4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(WIC008)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC030)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC018)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

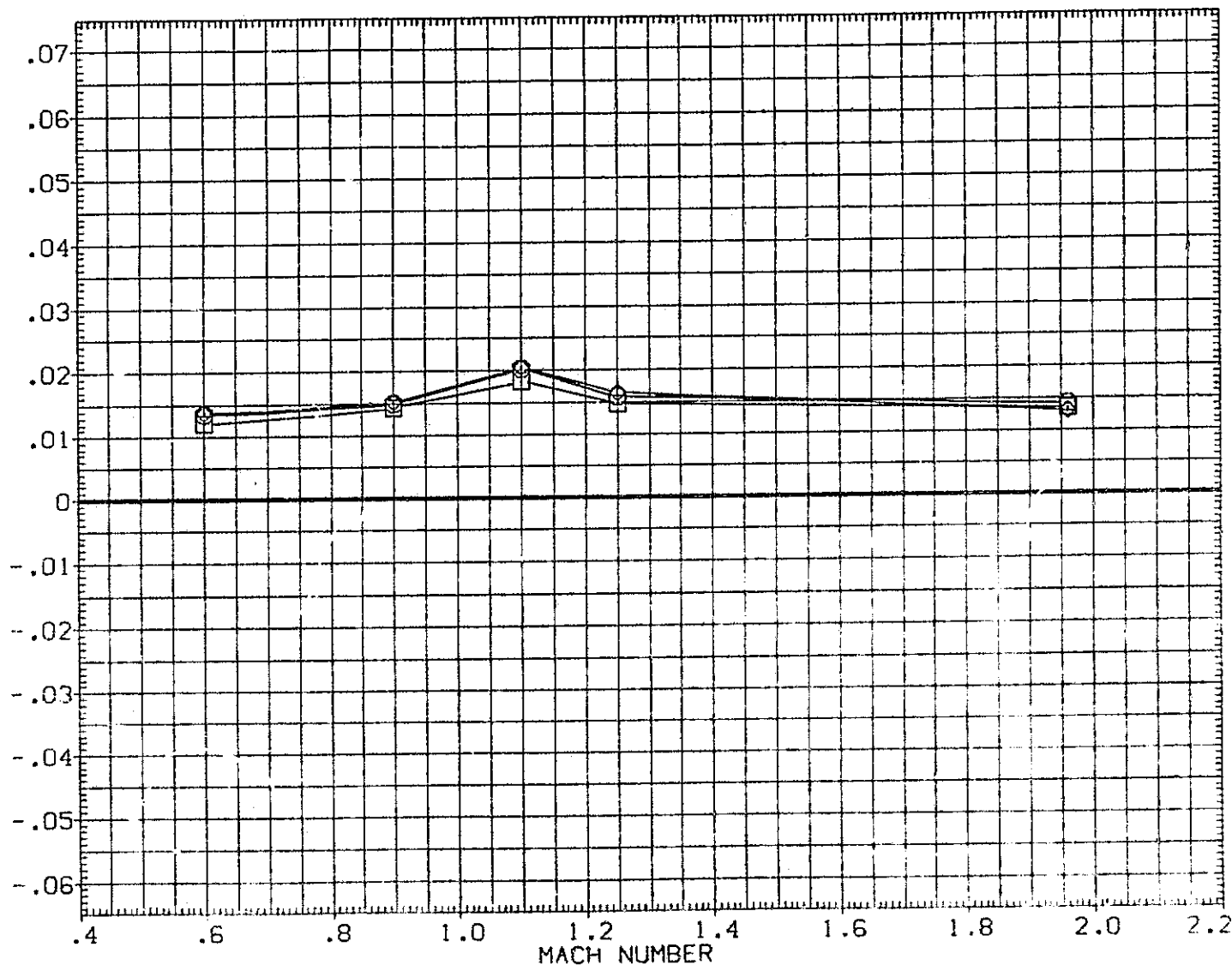


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(D)BETA = -2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008) □	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC030) □	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC018) ◇	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

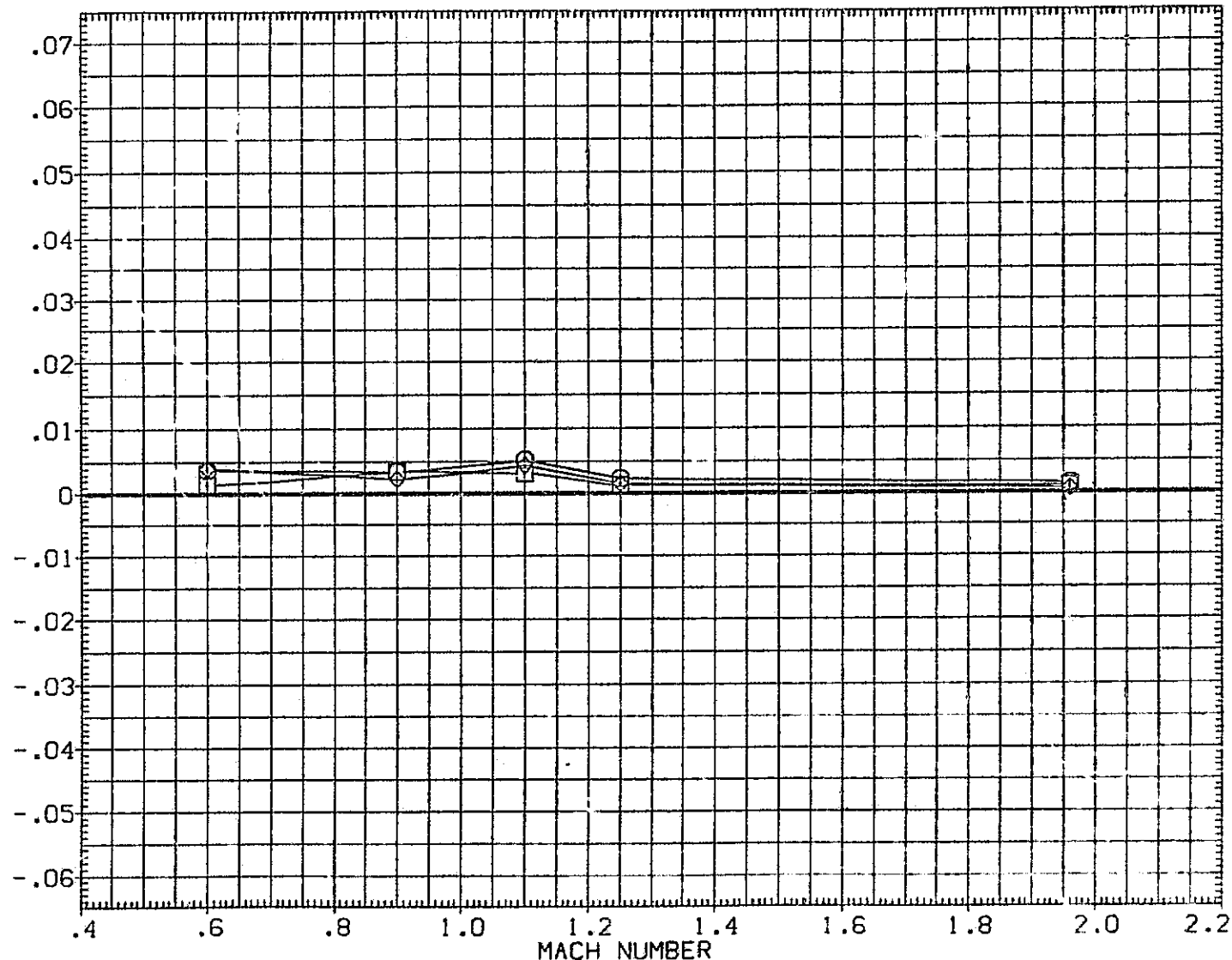


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(E)BETA = .00

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC009) ○	MSFC 594(1A33) 740TS (TIP)SIP201) ORB STING
(VIC030) □	MSFC 594(1A33) 740TS (TIP)SIP201) FORKED STING
(VIC018) ◇	MSFC 594(1A33) 740TS (TIP)SIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

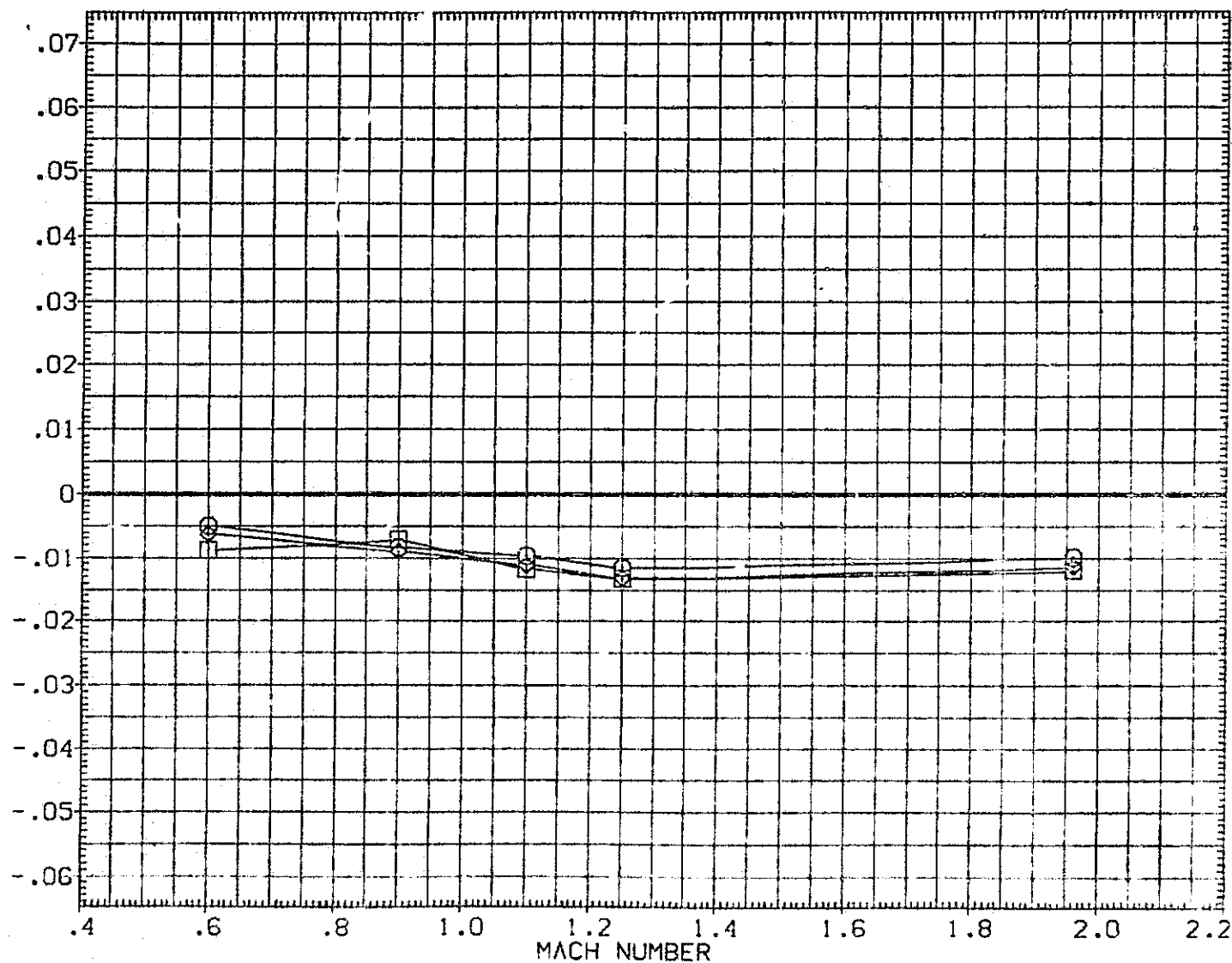


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(F)BETA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(1A33) 740TS (TIP)SIP201)	ORB STING
(VIC030)	MSFC 594(1A33) 740TS (TIP)SIP201)	FORKED STING
(VIC018)	MSFC 594(1A33) 740TS (TIP)SIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

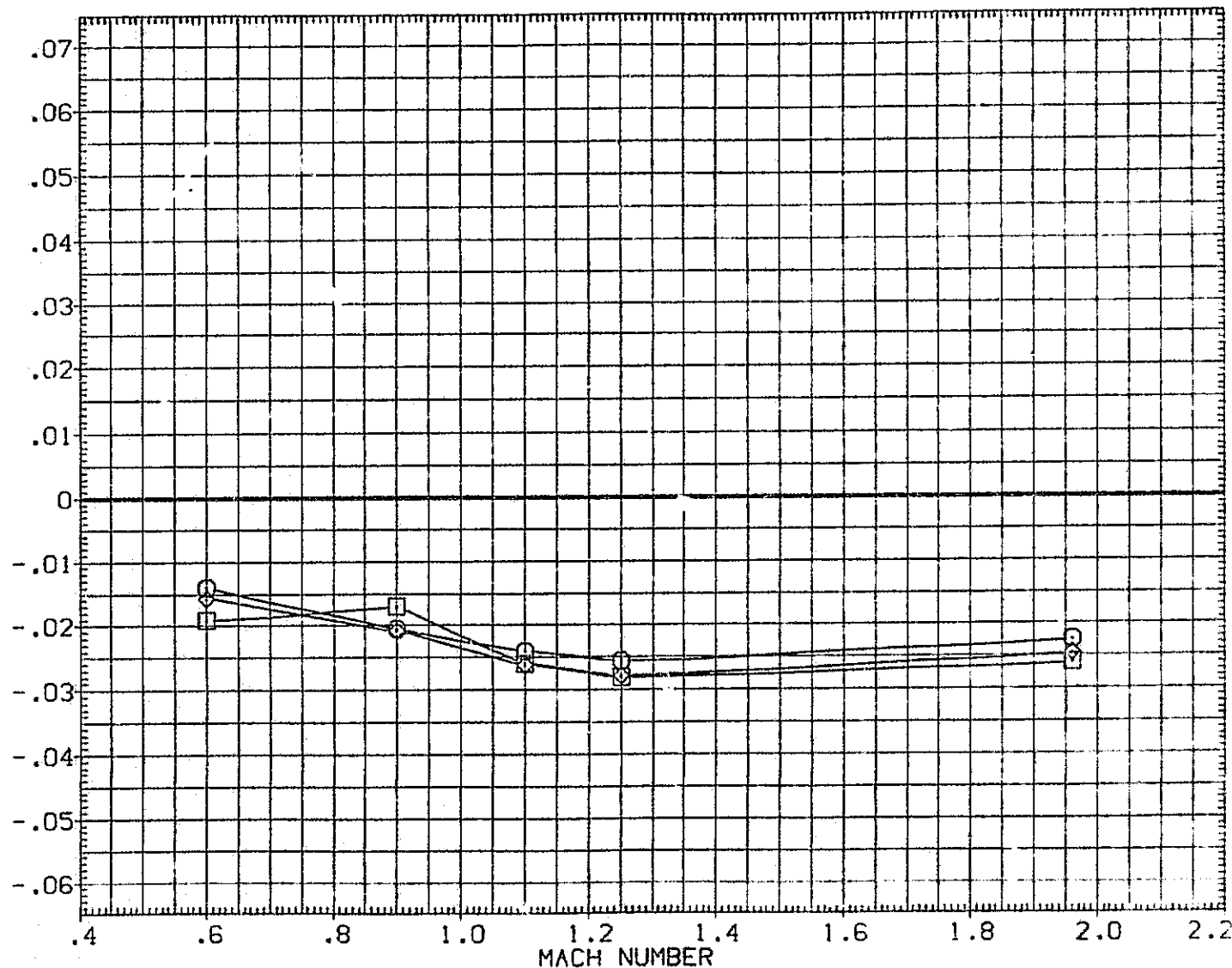


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(G)BETA = 4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VIC030)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(VIC018)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

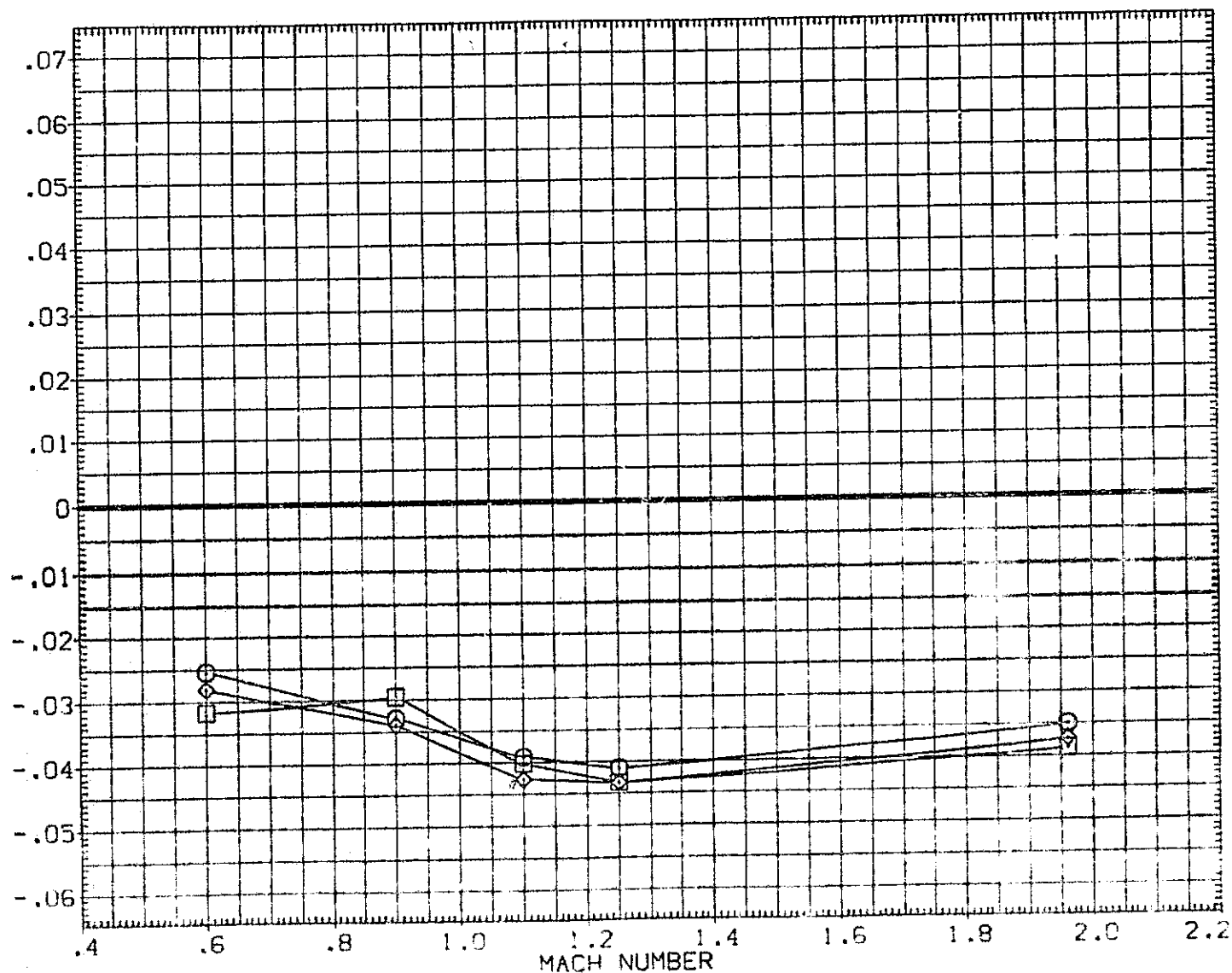


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008) ○	MSFC 594(1A33) 740TS (TIPISIP201) GRB STING
(VIC030) □	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC018) ◇	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

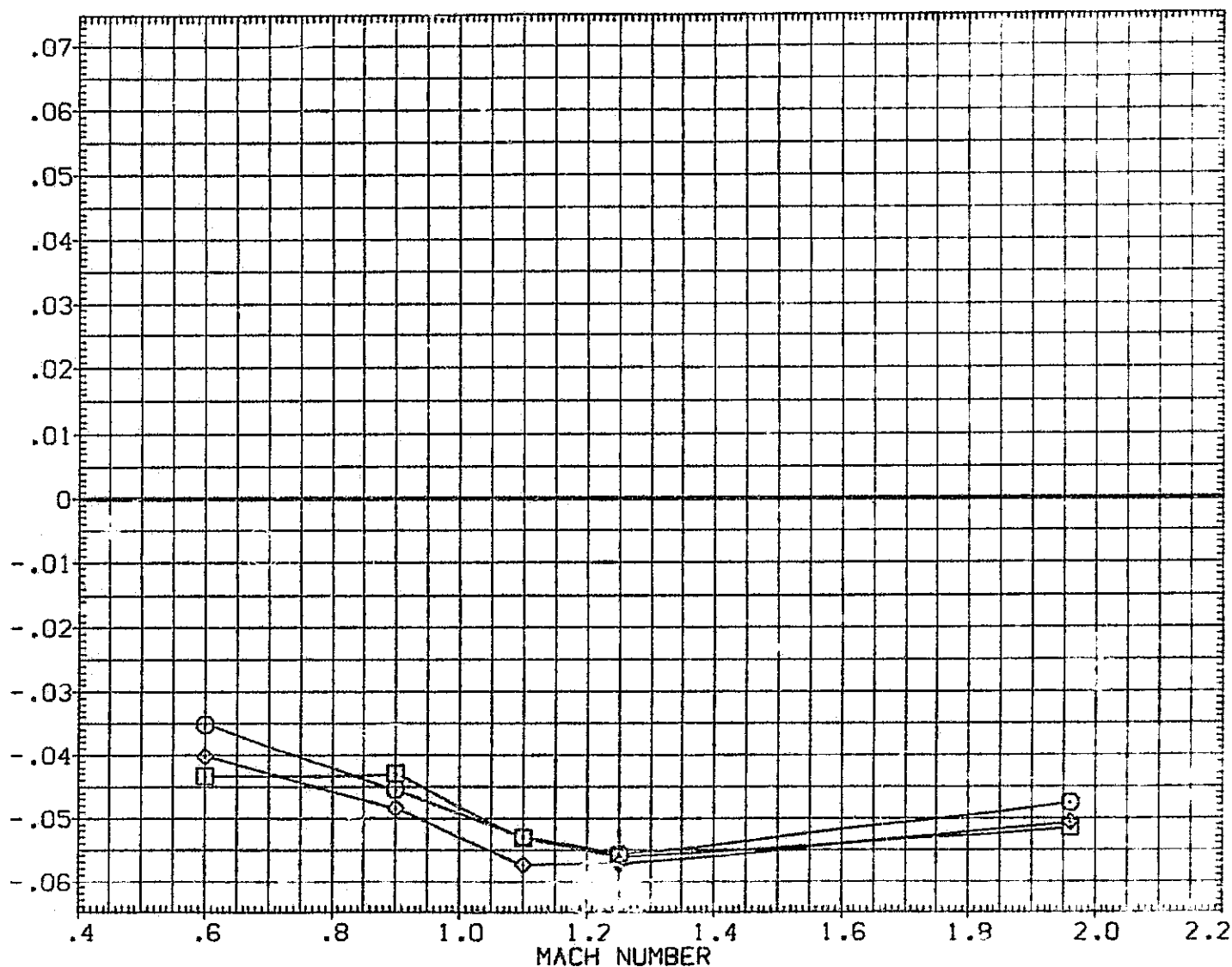


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(1) BETA = 8.00

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DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC008) \square MSFC 594(A33) 740TS (TIPISIP201) ORB STING
 (VIC030) \square MSFC 594(A33) 740TS (TIPISIP201) FORKED STING
 (VIC018) \diamond MSFC 594(A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

YAWING MOMENT COEFFICIENT, CYN

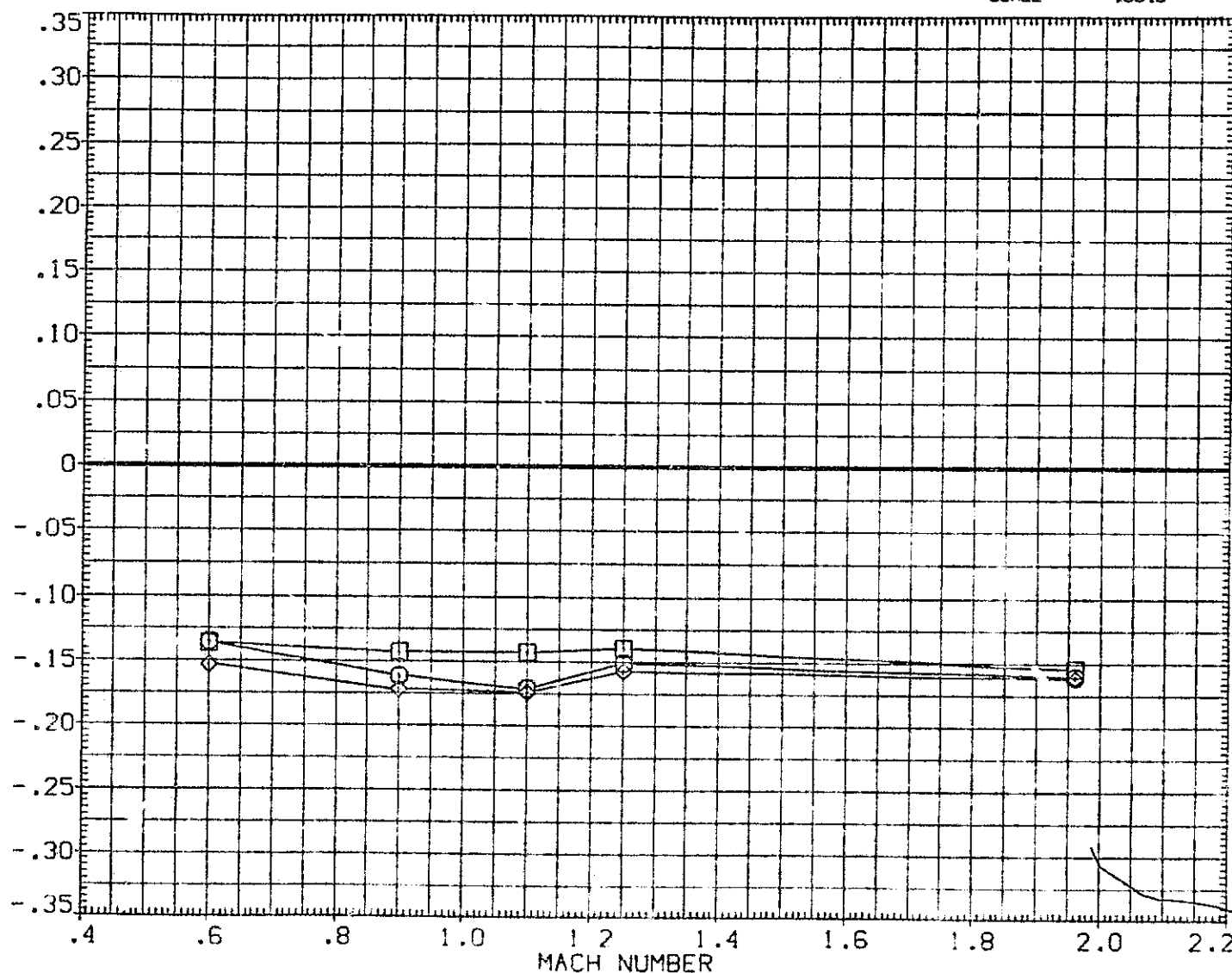


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(A) BETA = -8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIG STING
(VIC008)	MSFC 534((A33) 740TS (TIPISIP201)	ORIG STING
(VIC030)	MSFC 594((A33) 740TS (TIPISIP201)	FORKED STING
(VIC018)	MSFC 594((A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

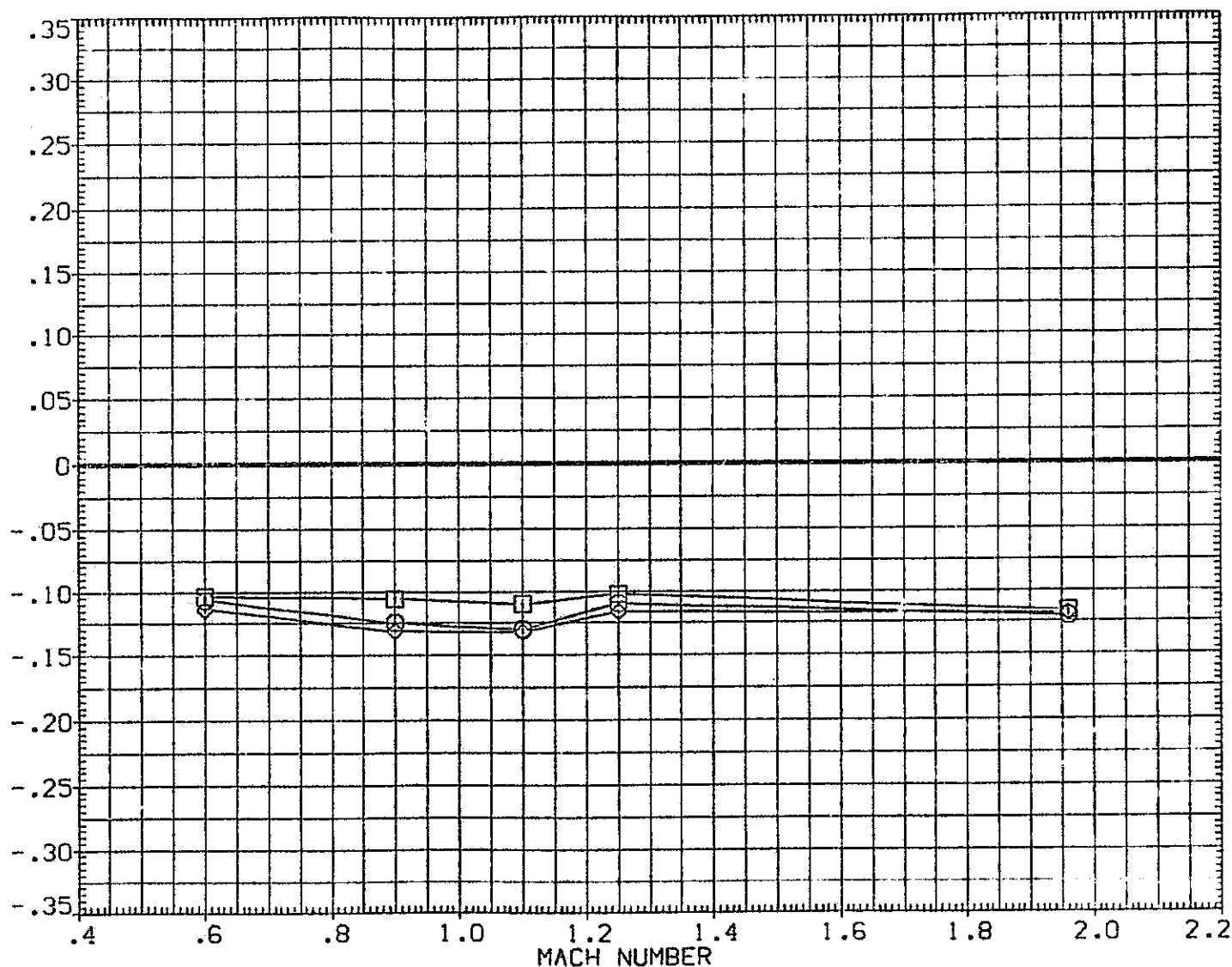


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(B) BETA = -6.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC008)	○	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VIC030)	□	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(VIC018)	◇	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

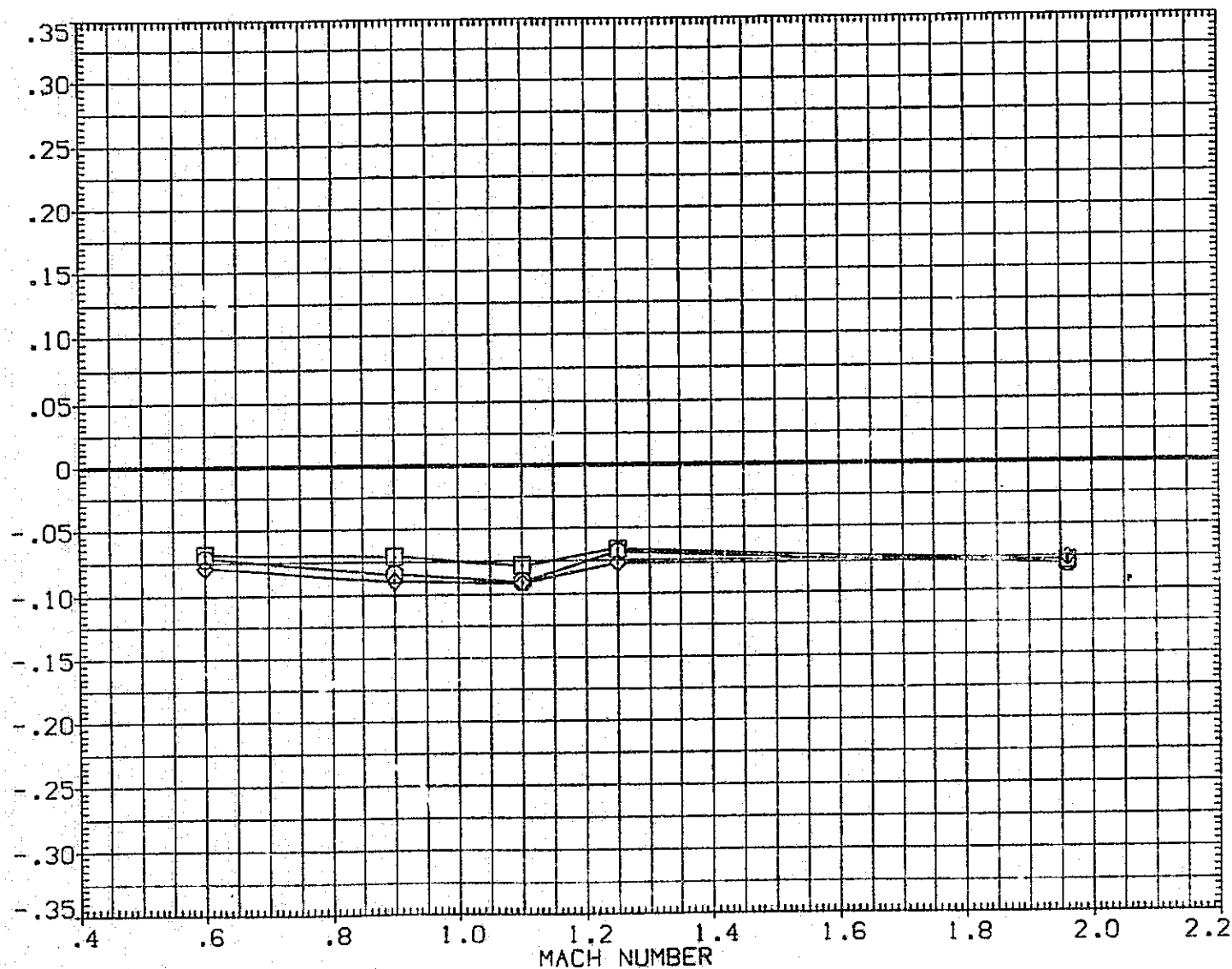


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO
(C)BETA = -4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORIG STING
(VIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORIG STING
(VIC030)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING
(VIC018)	MSFC 594(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	576.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

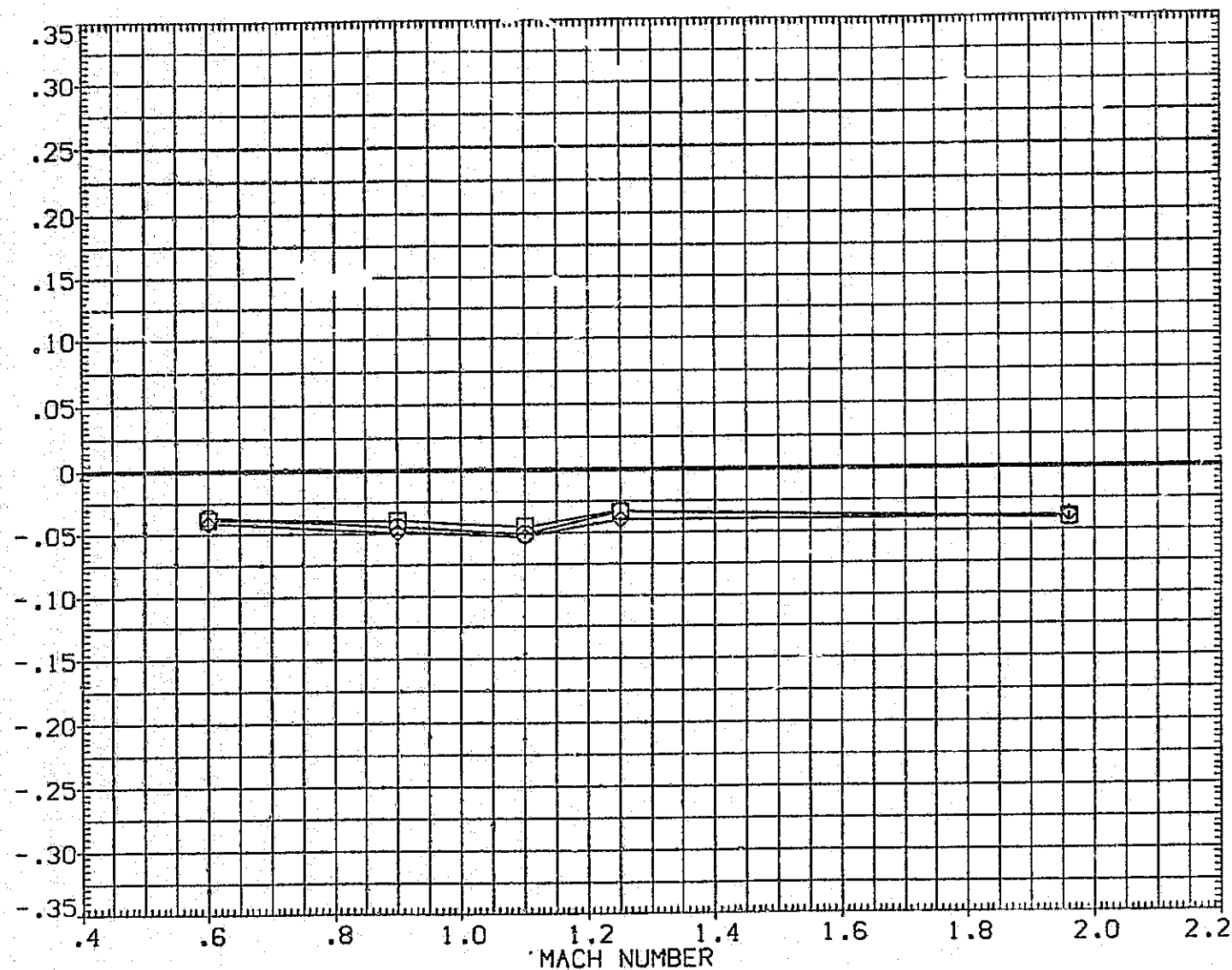


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(D)BETA = -2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008) ○	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC030) □	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC018) ◇	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

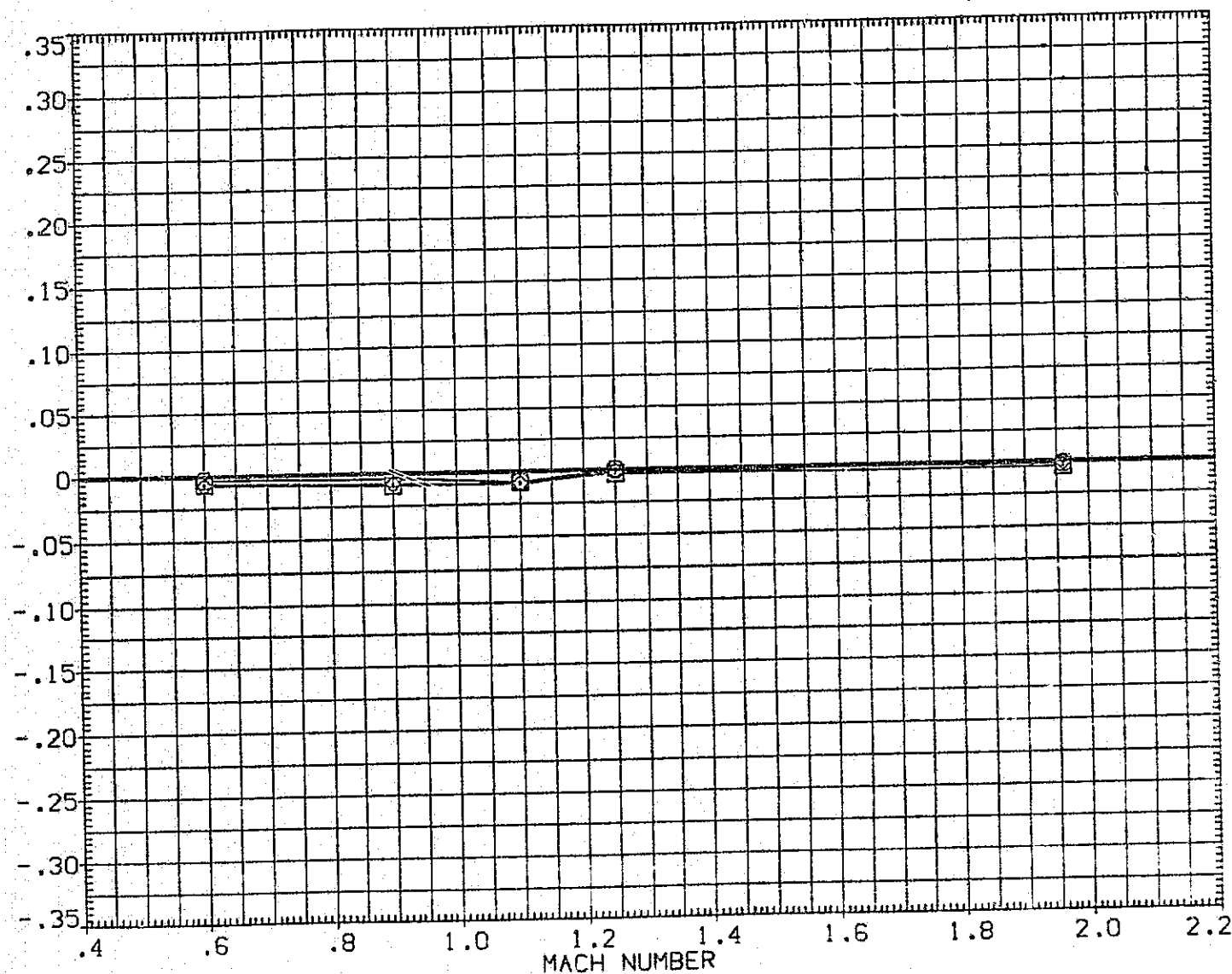


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(E)BETA = .00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC030)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC018)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

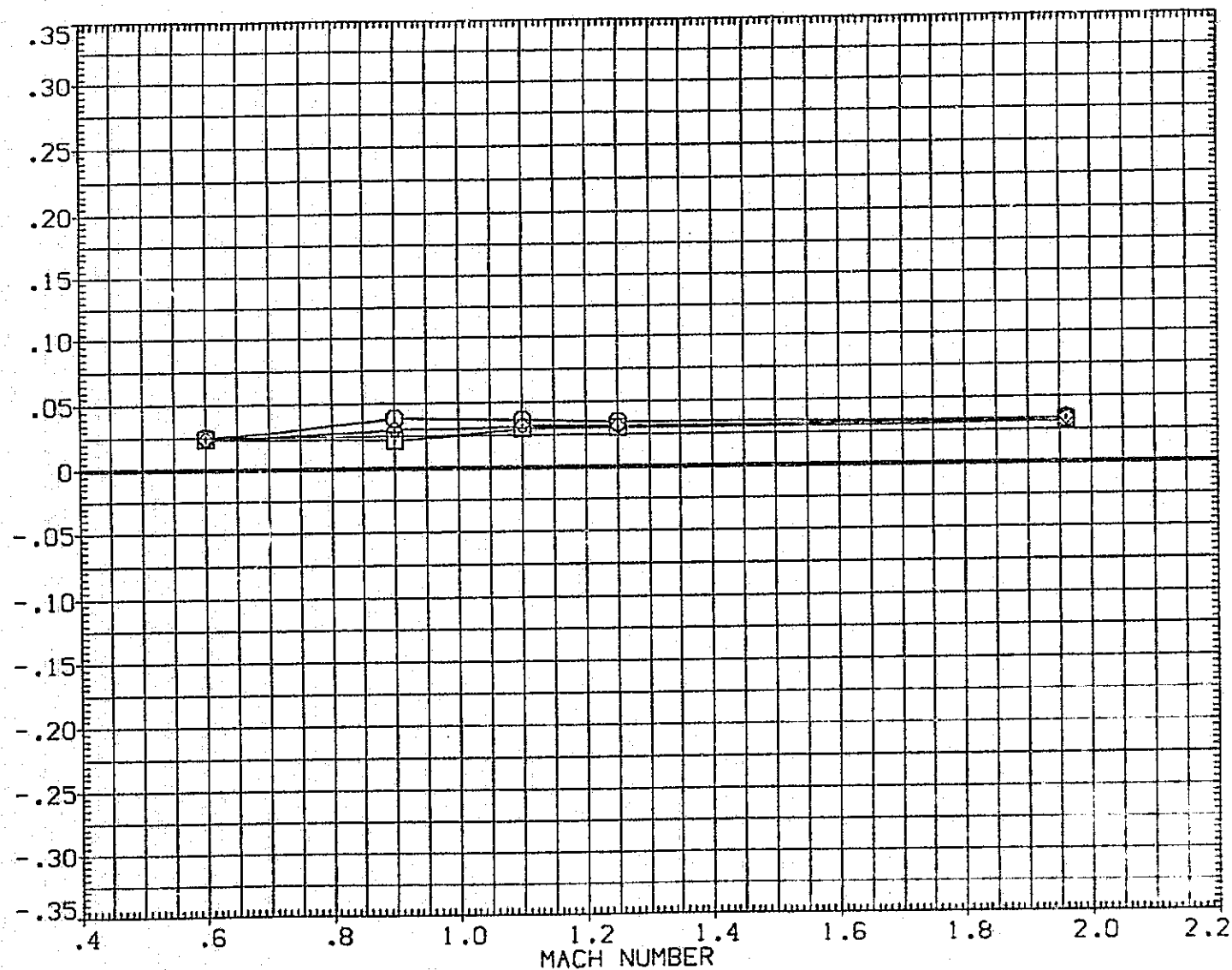


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(F)BETA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC008)	MSFC S94(1A33) 740TS (TIPISIP201)	ORB STING
(VIC030)	MSFC S94(1A33) 740TS (TIPISIP201)	FORKED STING
(VIC018)	MSFC S94(1A33) 740TS (TIPISIP201)	FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

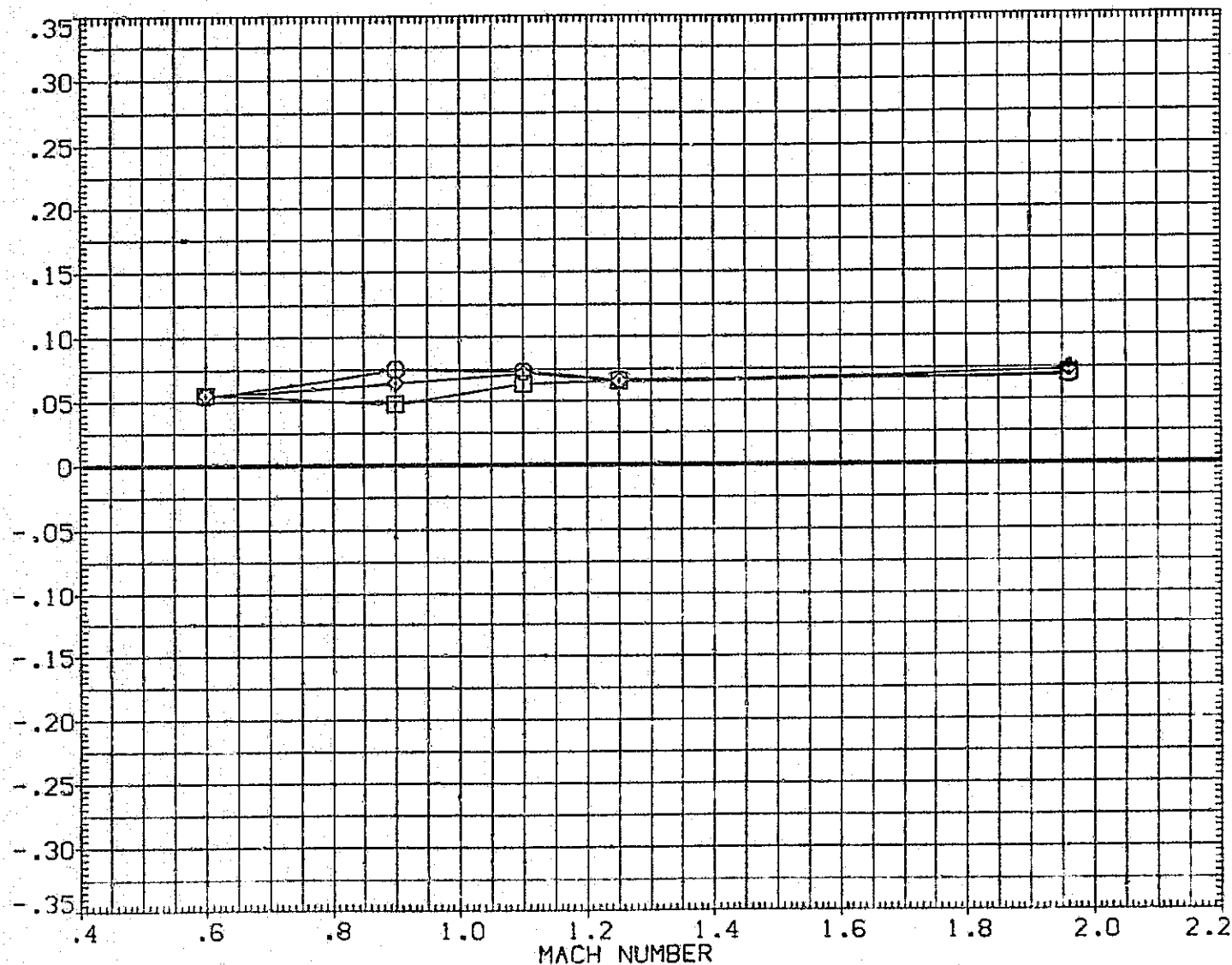


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(G) BETA = 4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(WIC008)	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(WIC030)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(WIC018)	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	576.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

YAWING MOMENT COEFFICIENT, CYN

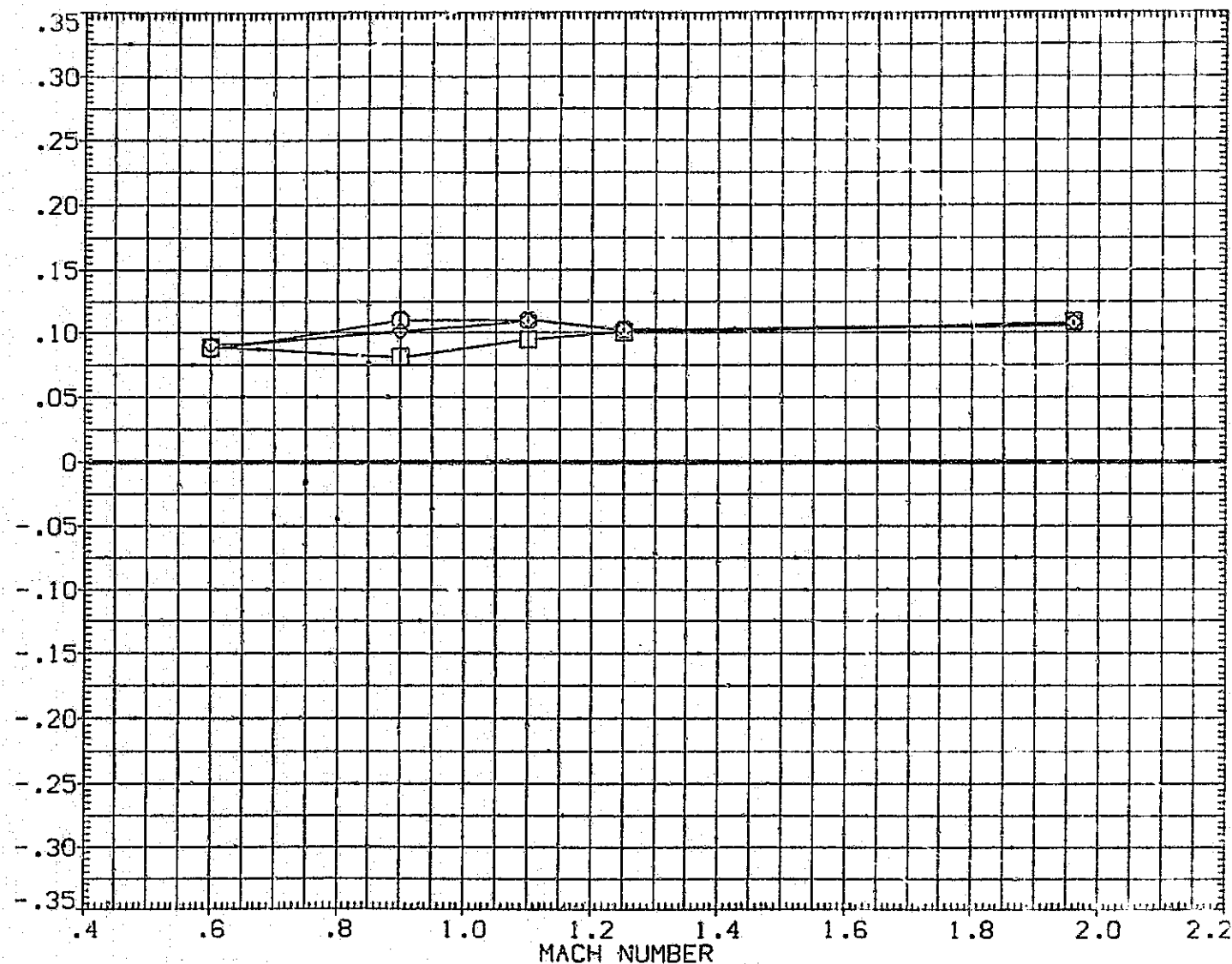


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(H)BETA = 6.00

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC008) □	MSFC 594(1A33) 740TS (TIPISIP201) ORB STING
(VIC030) □	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING
(VIC018) ◇	MSFC 594(1A33) 740TS (TIPISIP201) FORKED STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

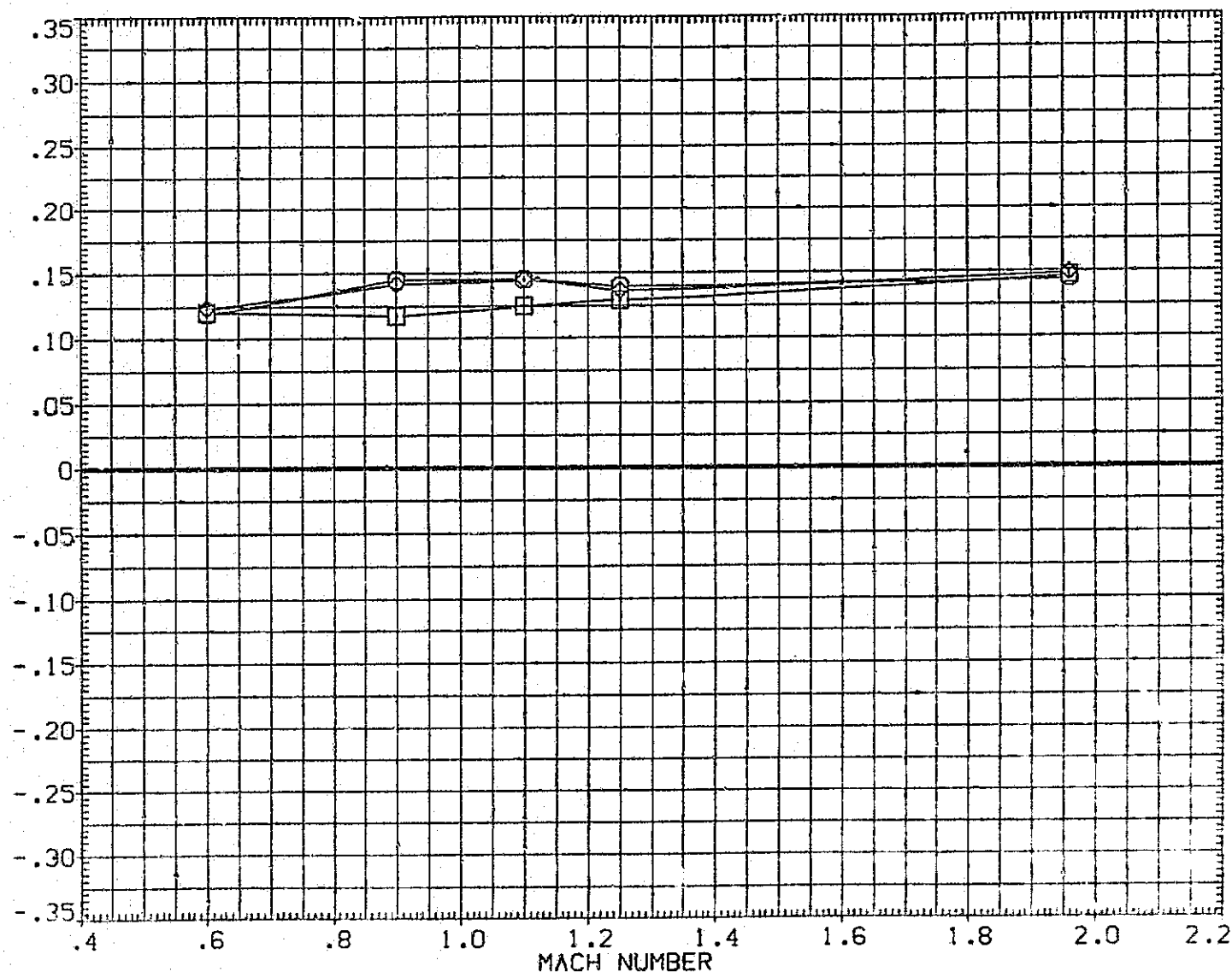


FIG 9 LAUNCH VEHICLE-FIRST STAGE-STING EFFECTS ON LATERAL/DIRECTIONAL AERO

(1) BETA = 8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC035)	DATA NOT AVAILABLE
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)

REFERENCE INFORMATION		
SREF	2690.0000	SI. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	975.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

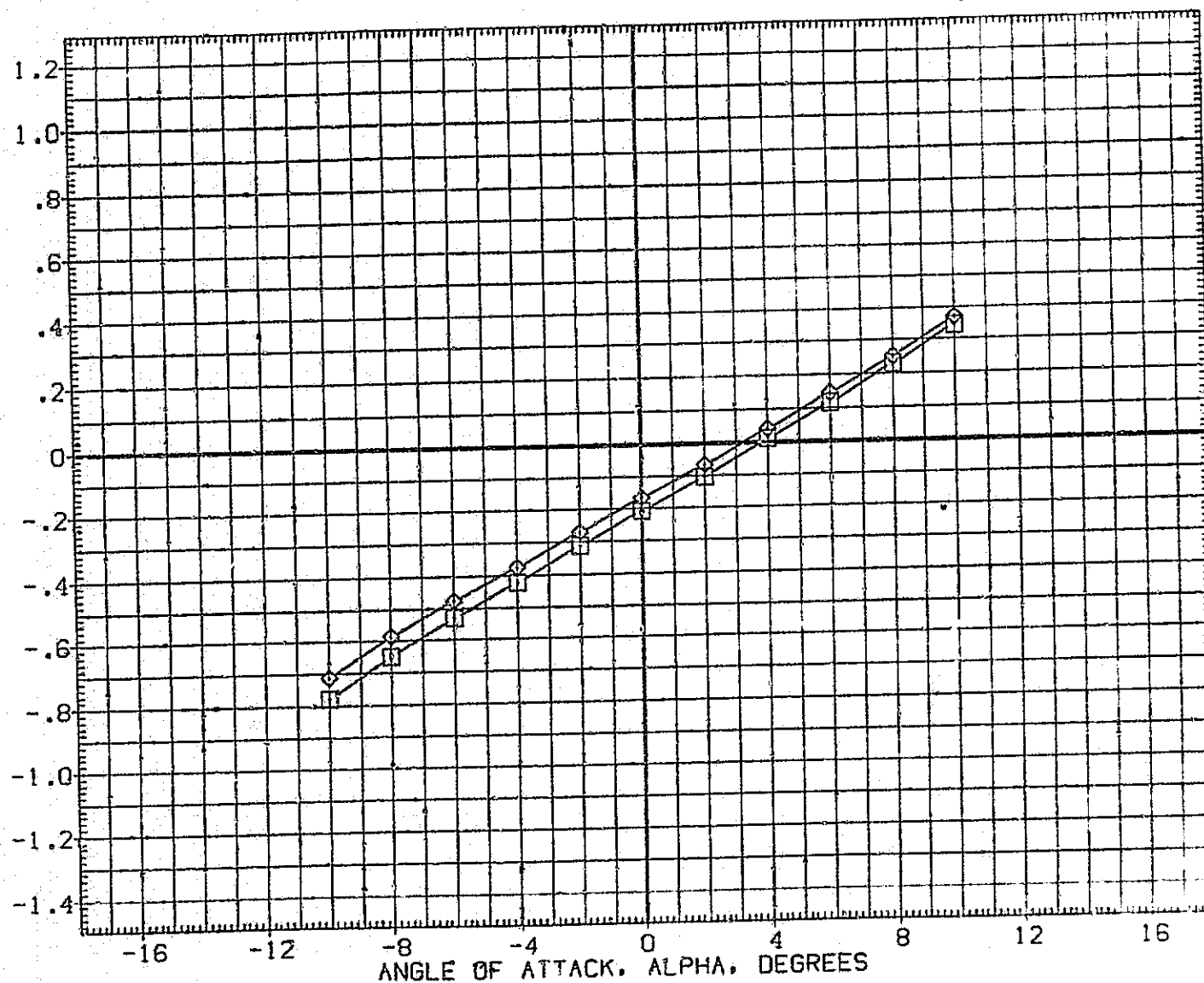


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
 (A)MACH = .60

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC035) ○ DATA NOT AVAILABLE
 (VIC021) □ MSFC 594(1A33) 740TS (T2P1S3P201F2) ORB STING
 (VIC007) ◇ MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

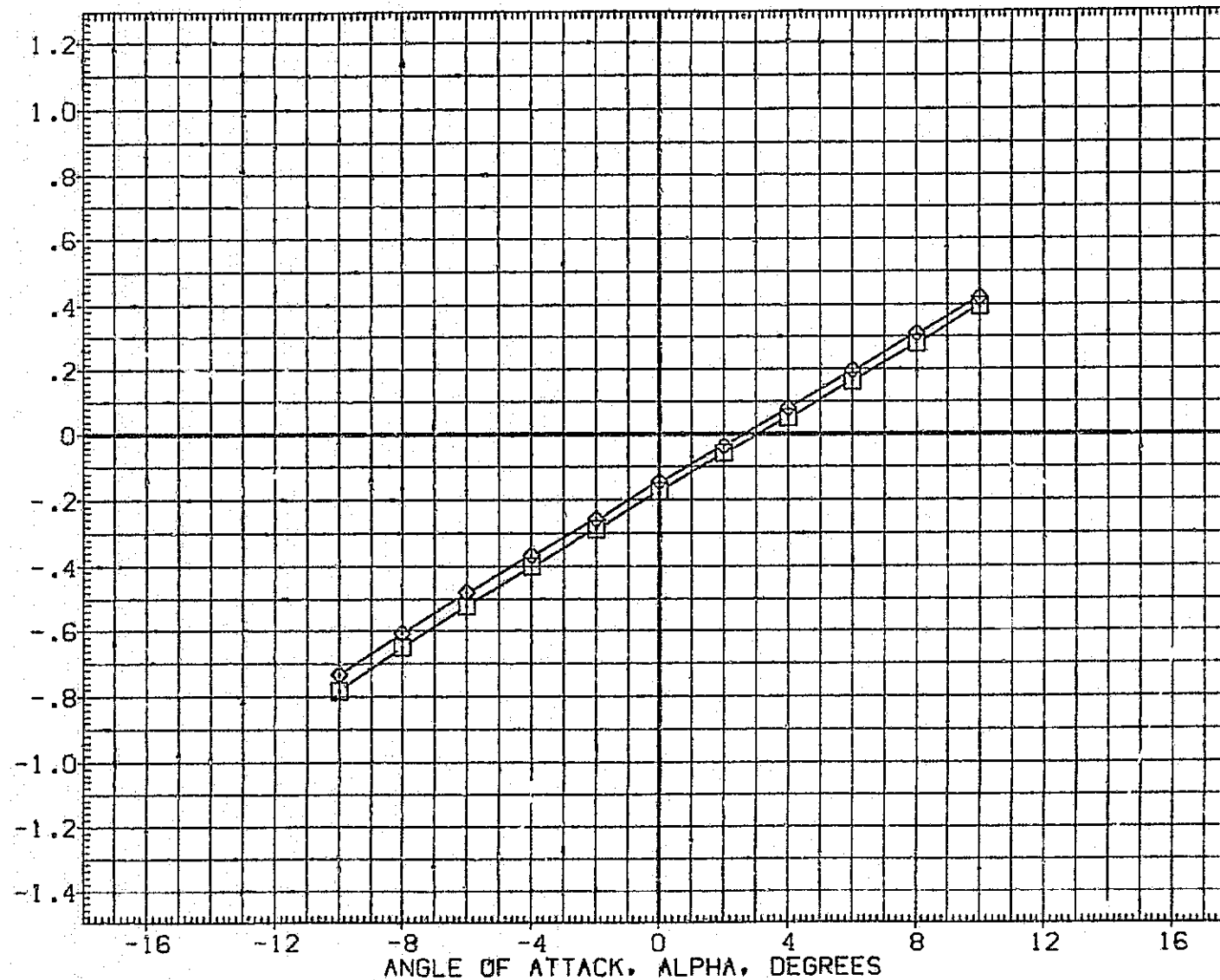


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC035)	DATA NOT AVAILABLE	
(VIC021)	MSFC S94(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC S94(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

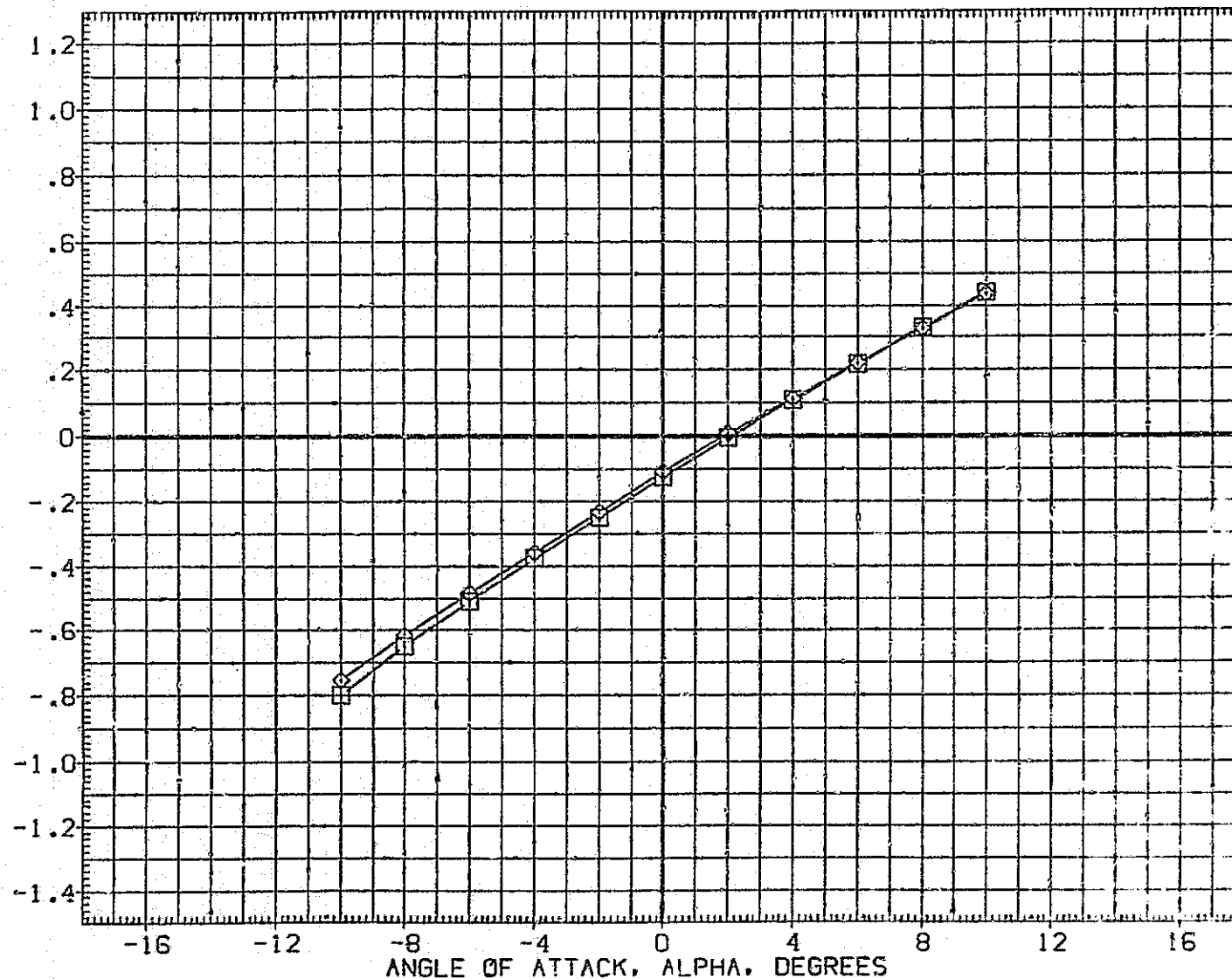


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(C)MACH = .90

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DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC035) □ DATA NOT AVAILABLE
 (VIC021) □ MSFC 594(1A33) 740TS (T2PIS3P201F2) ORB STING
 (VIC007) ◇ MSFC 594(1A33) 740TS (T1PISIP201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

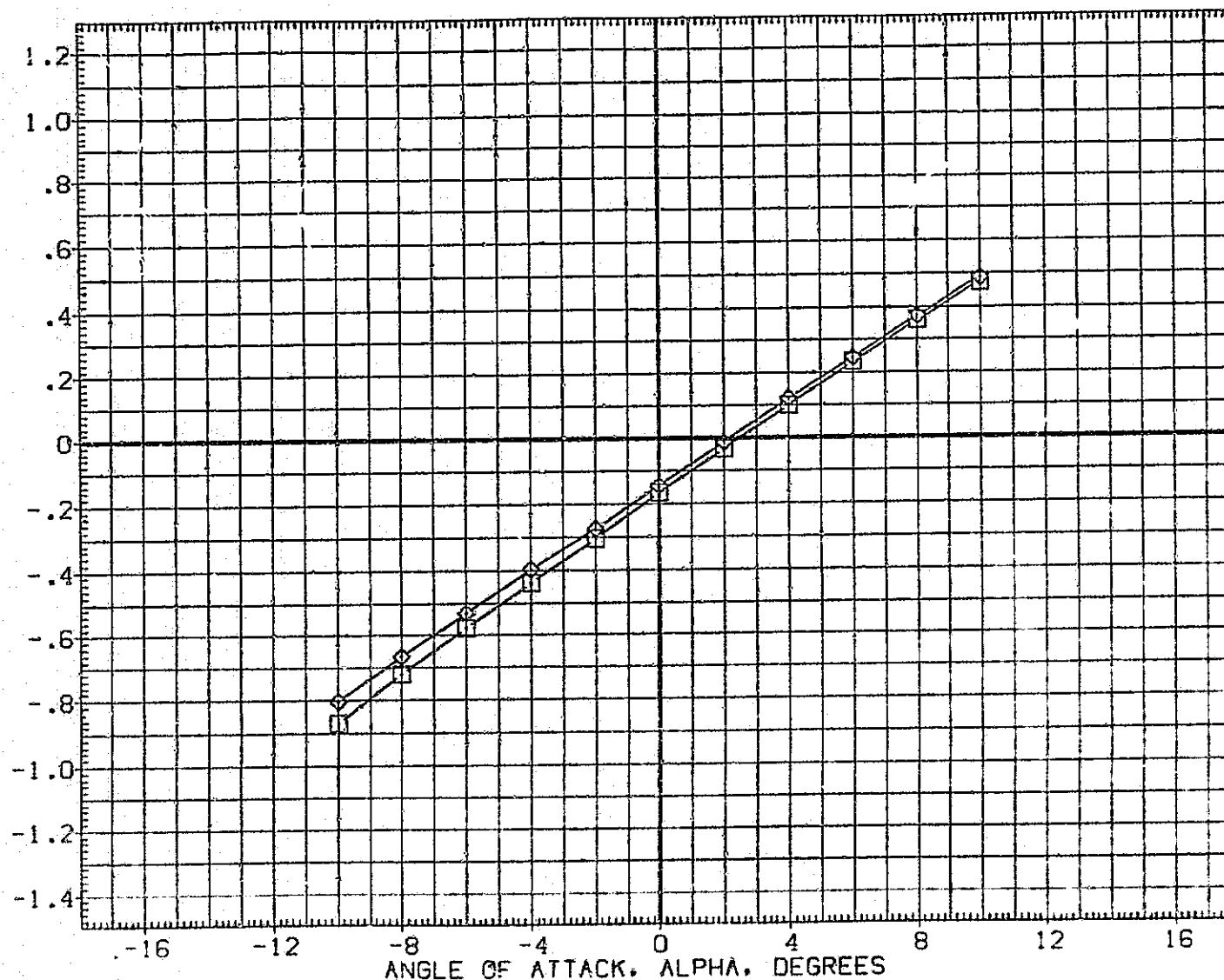


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(D)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC035)	DATA NOT AVAILABLE	
(VIC021)	MSFC S94(1A33) 740TS (T2PIS3P201F2)	ORB STING
(VIC007)	MSFC S94(1A33) 740TS (T1PIS1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

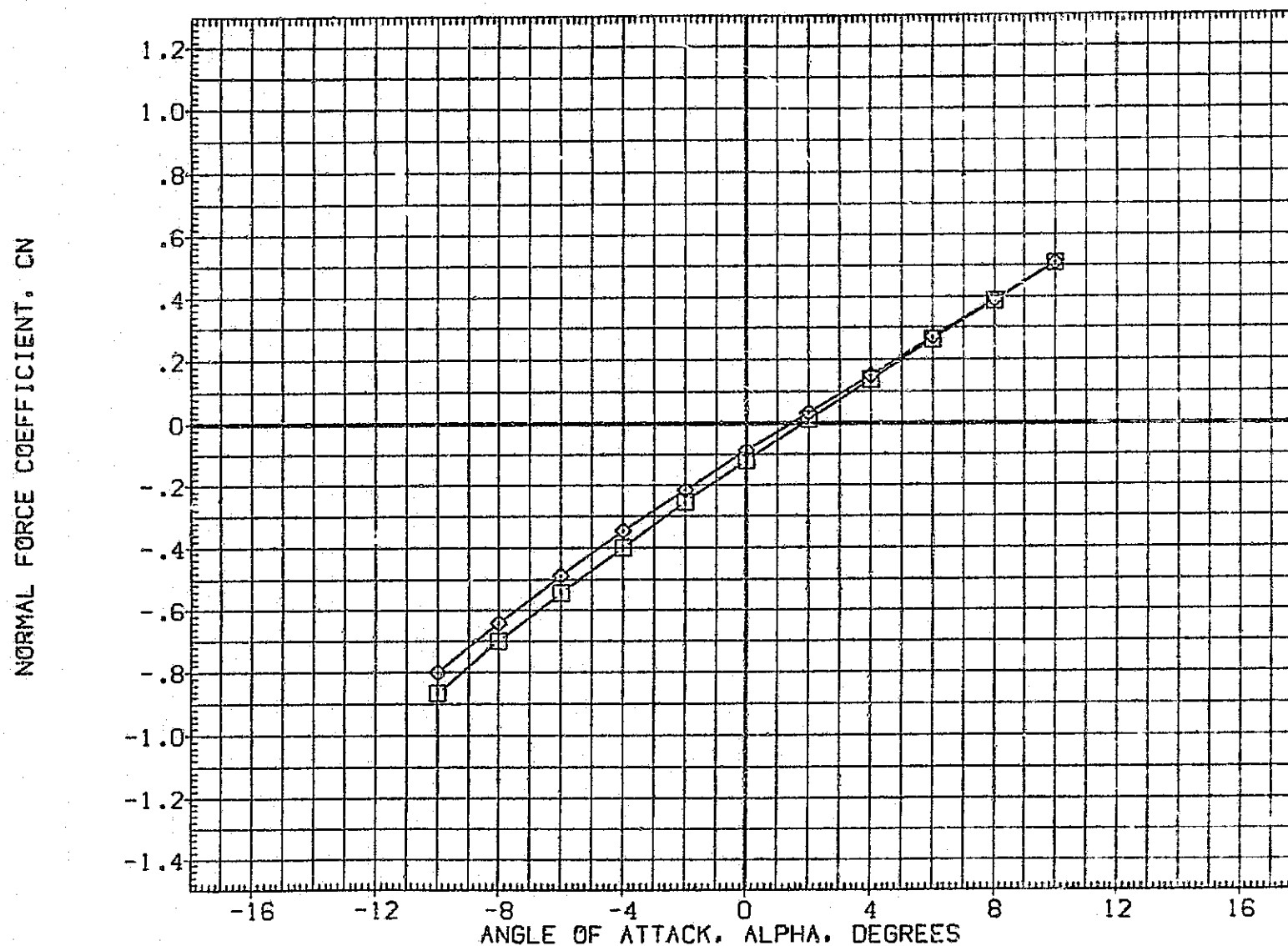


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LONGITUDINAL AERO

(E)MACH = 1.25

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DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC035) □ DATA NOT AVAILABLE
 (VIC021) □ MSFC 594(A33) 740TS (T2PIS3P201F2) ORB STING
 (VIC007) ◇ MSFC 594(A33) 740TS (TIPISIP201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

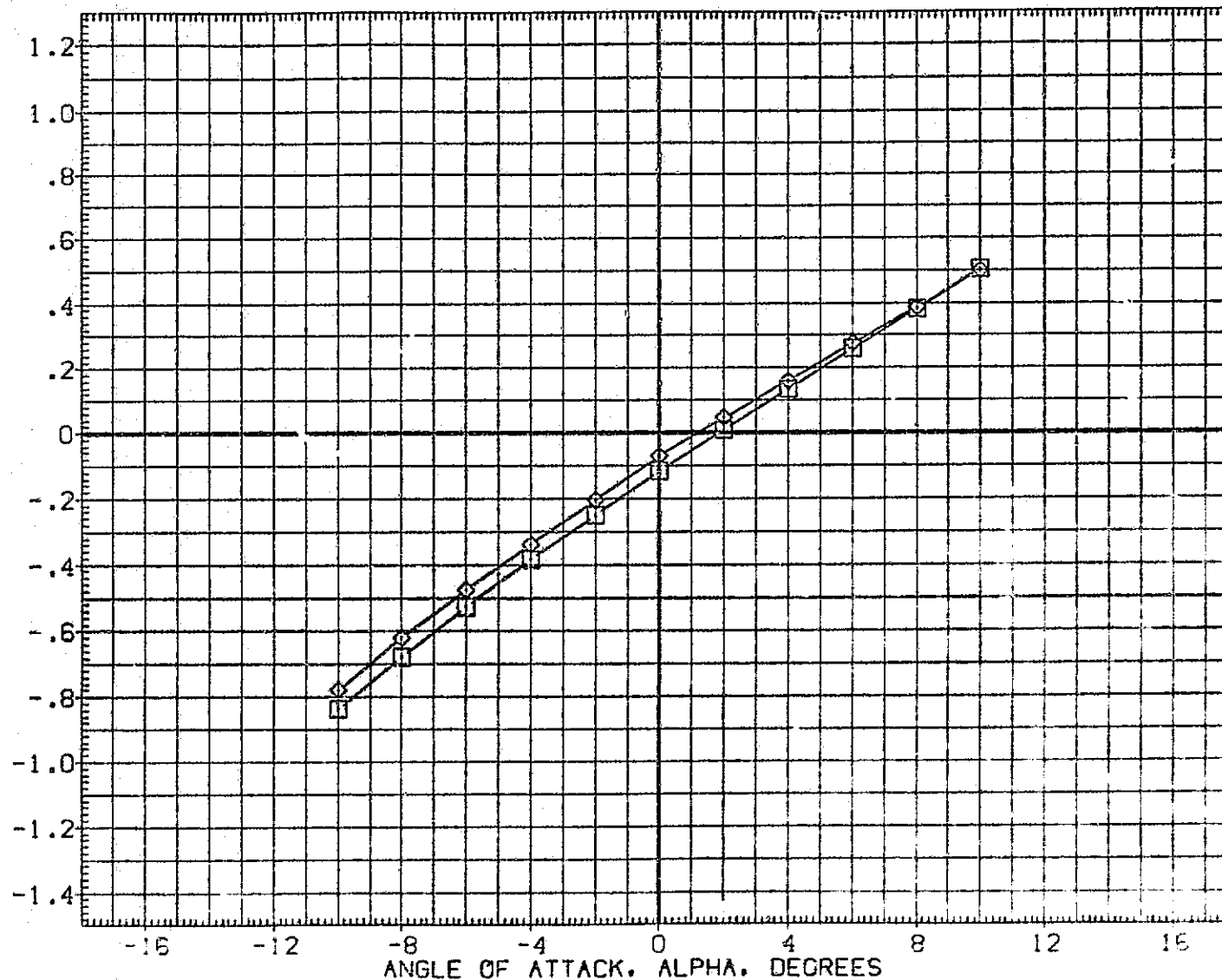


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(F)MACH = 1.46

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC035)	DATA NOT AVAILABLE	
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

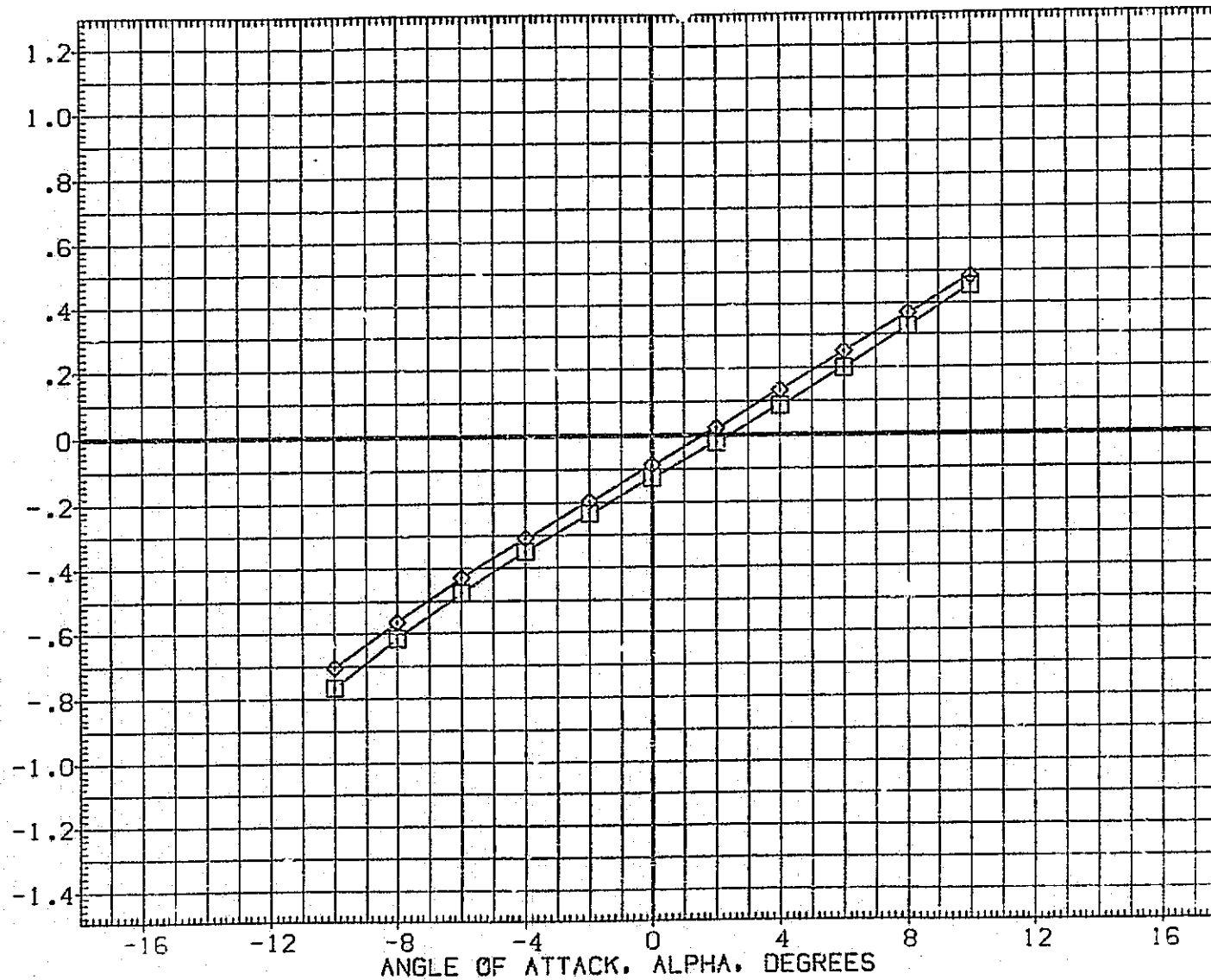


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(G)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594 (IA33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594 (IA33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594 (IA33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

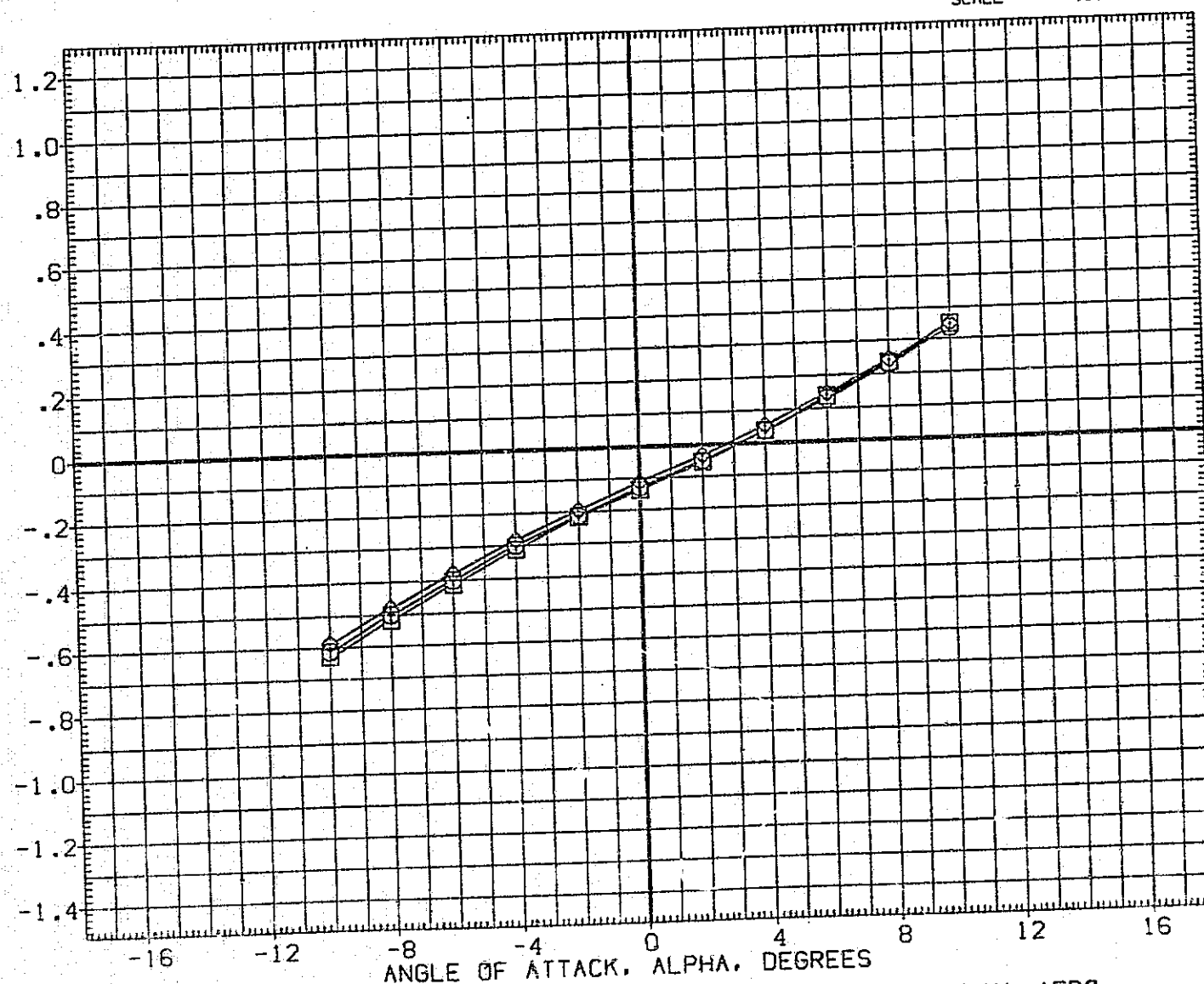


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LONGITUDINAL AERO
(H)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
[VIC035]	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
[VIC021]	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
[VIC007]	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

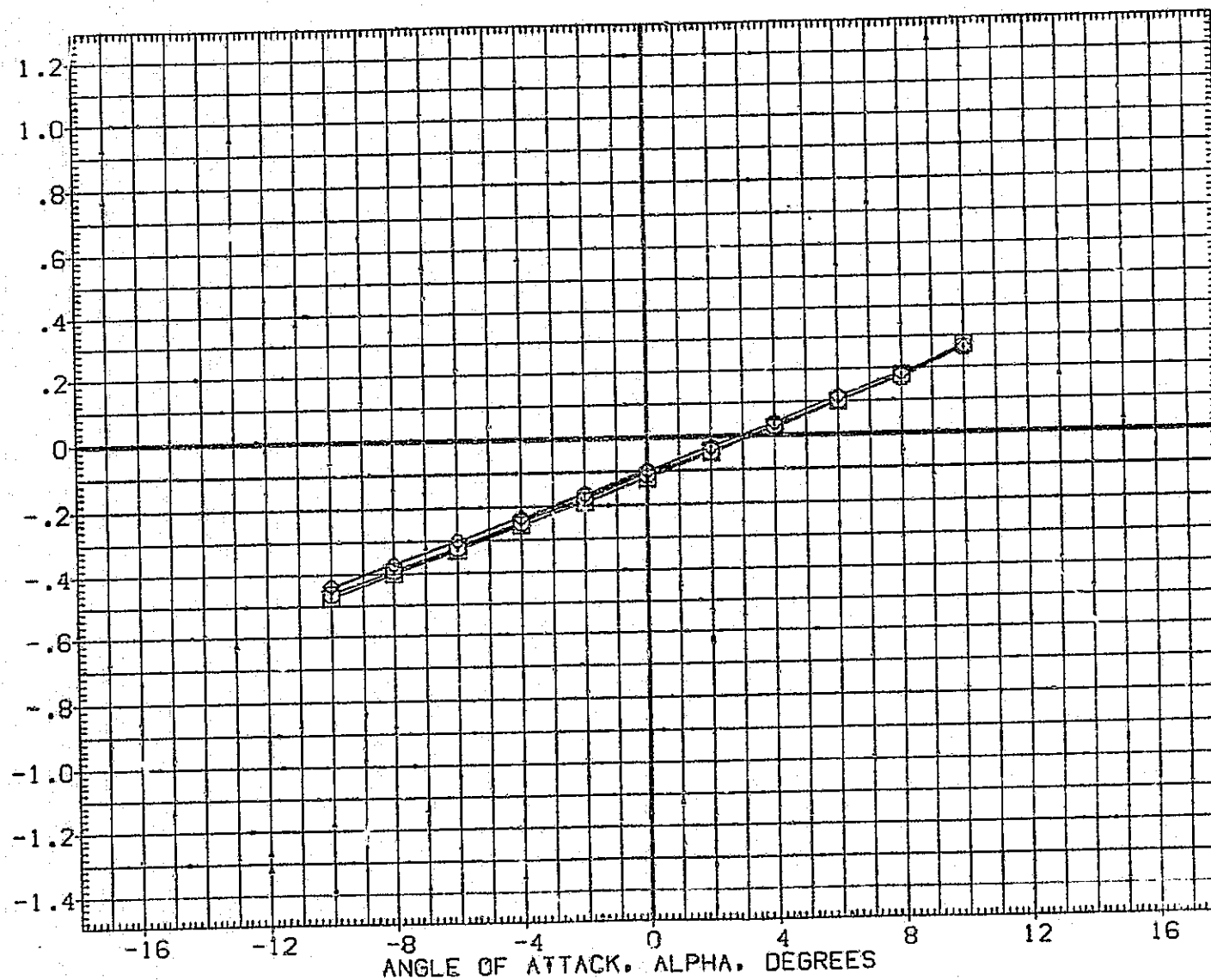


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(1)MACH = 4.96

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC035) DATA NOT AVAILABLE
 (VIC021) MSFC 594(A33) 740TS (T2P1S3P201F2) ORB STING
 (VIC007) MSFC 594(A33) 740TS (T1P1S1P201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 576.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

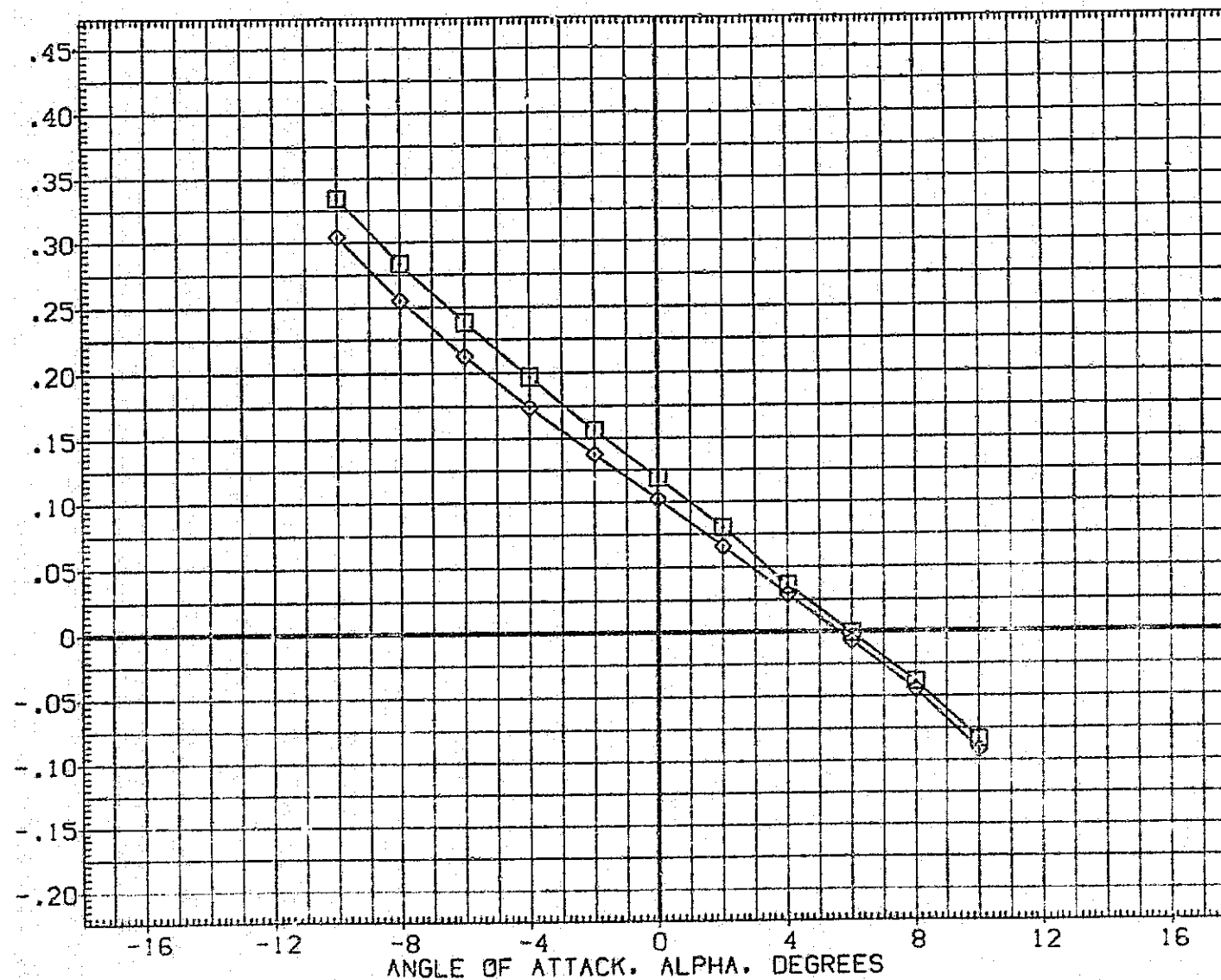


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LONGITUDINAL AERO

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC035)	DATA NOT AVAILABLE	
(VIC021)	MSFC S94(1A33) 740TS (T2P1S3P20IF2)	ORB STING
(VIC007)	MSFC S94(1A33) 740TS (T1P1S1P20I)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	975.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

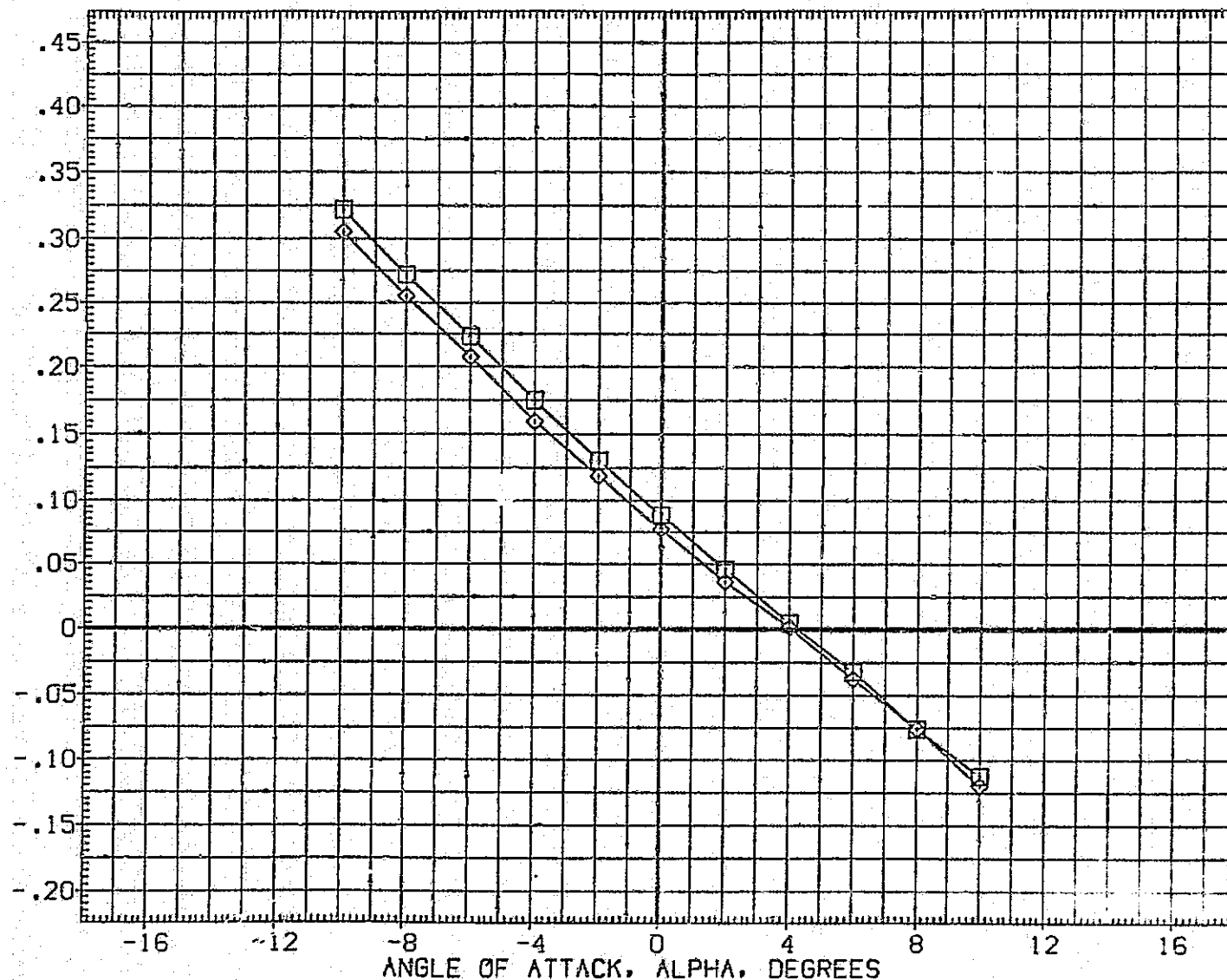


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(B)MACH = .80

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC035) DATA NOT AVAILABLE
 (VIC021) MSFC 594(A33) 740TS (T2P1S3P201F2) ORB STING
 (VIC007) MSFC 594(A33) 740TS (T1P1S1P201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

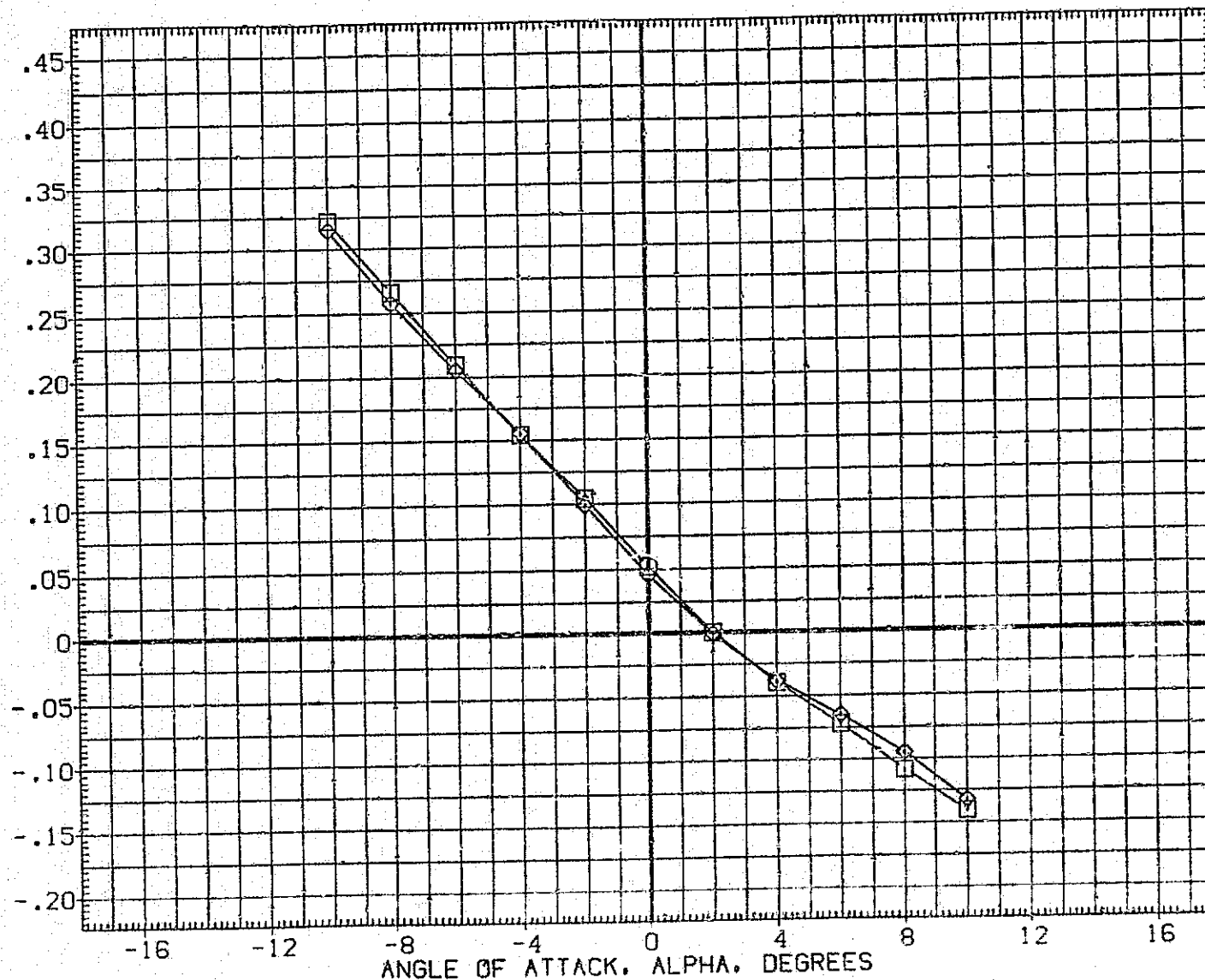


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC035)	DATA NOT AVAILABLE	
(VIC021)	MSFC 594(1A33) 740TS (T2P153P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (TIP151P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

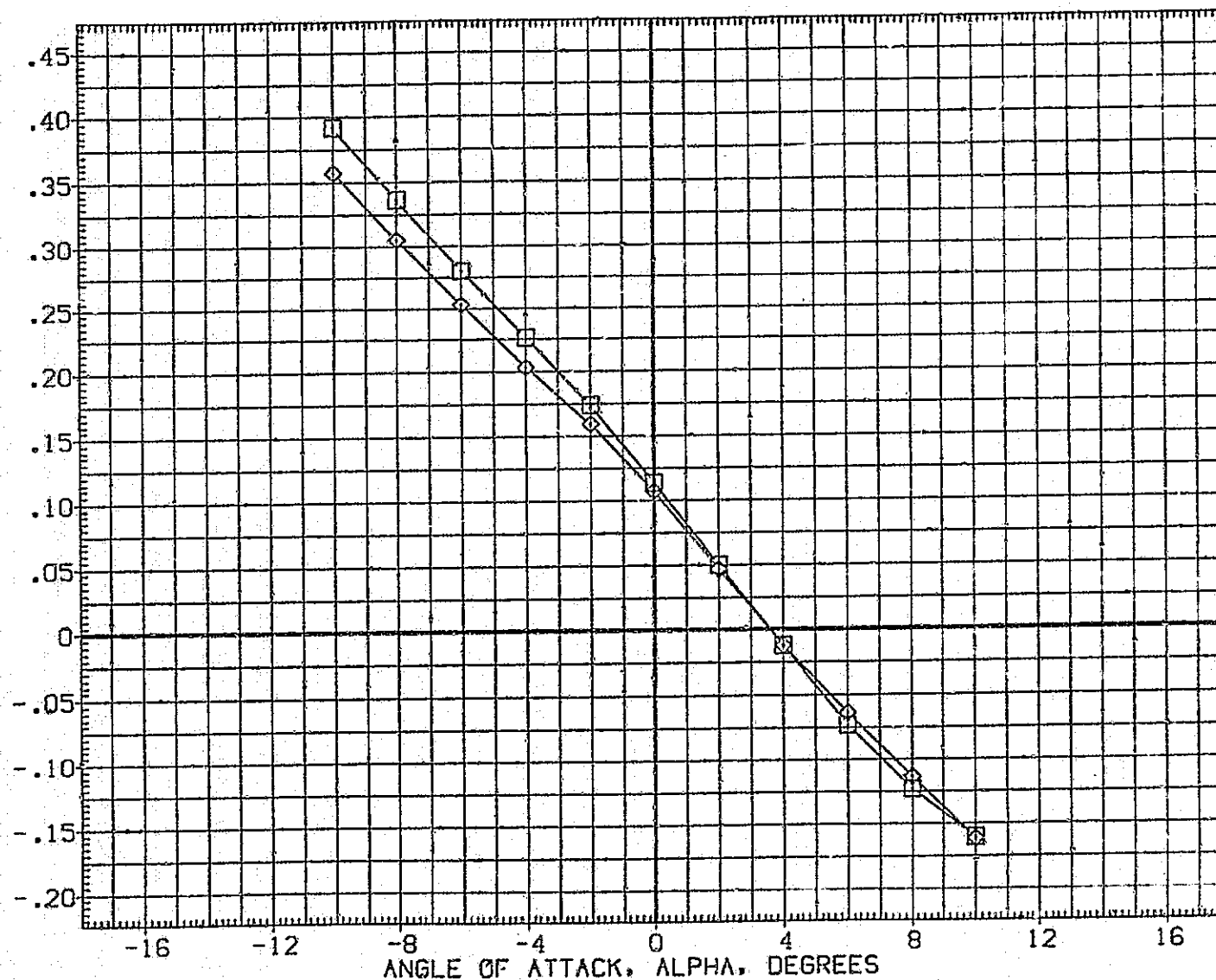


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(D)MACH = 1.10

DATA SET SYMBOL CONFIGURATION DESCRIPTION

[VIC035] DATA NOT AVAILABLE
 [VIC021] MSFC 594(1A33) 740TS (T2P153P201F2) ORB STING
 [VIC007] MSFC 594(1A33) 740TS (T1P151P201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

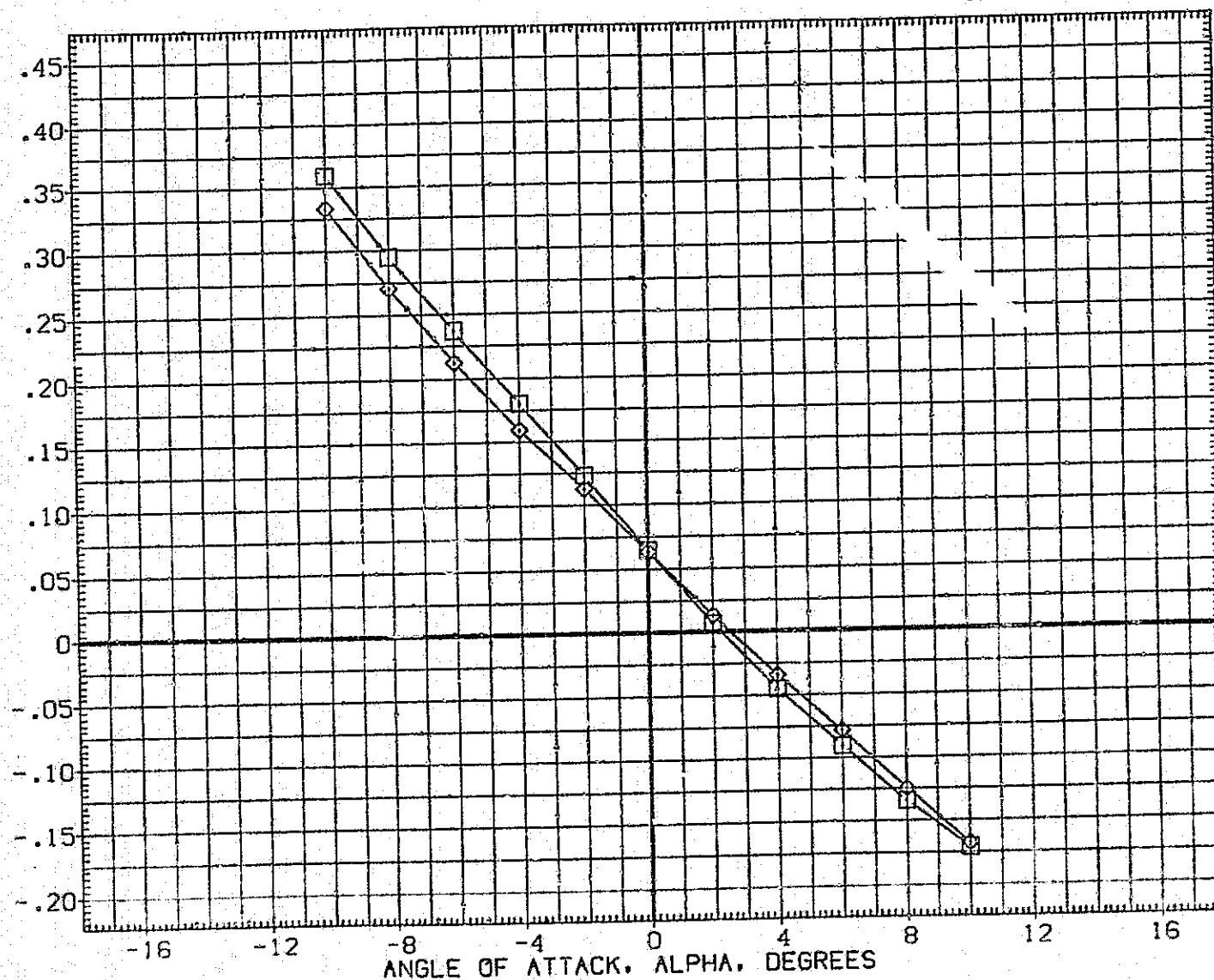


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(E)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC035)	DATA NOT AVAILABLE	
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P20IF2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P20I)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.9000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

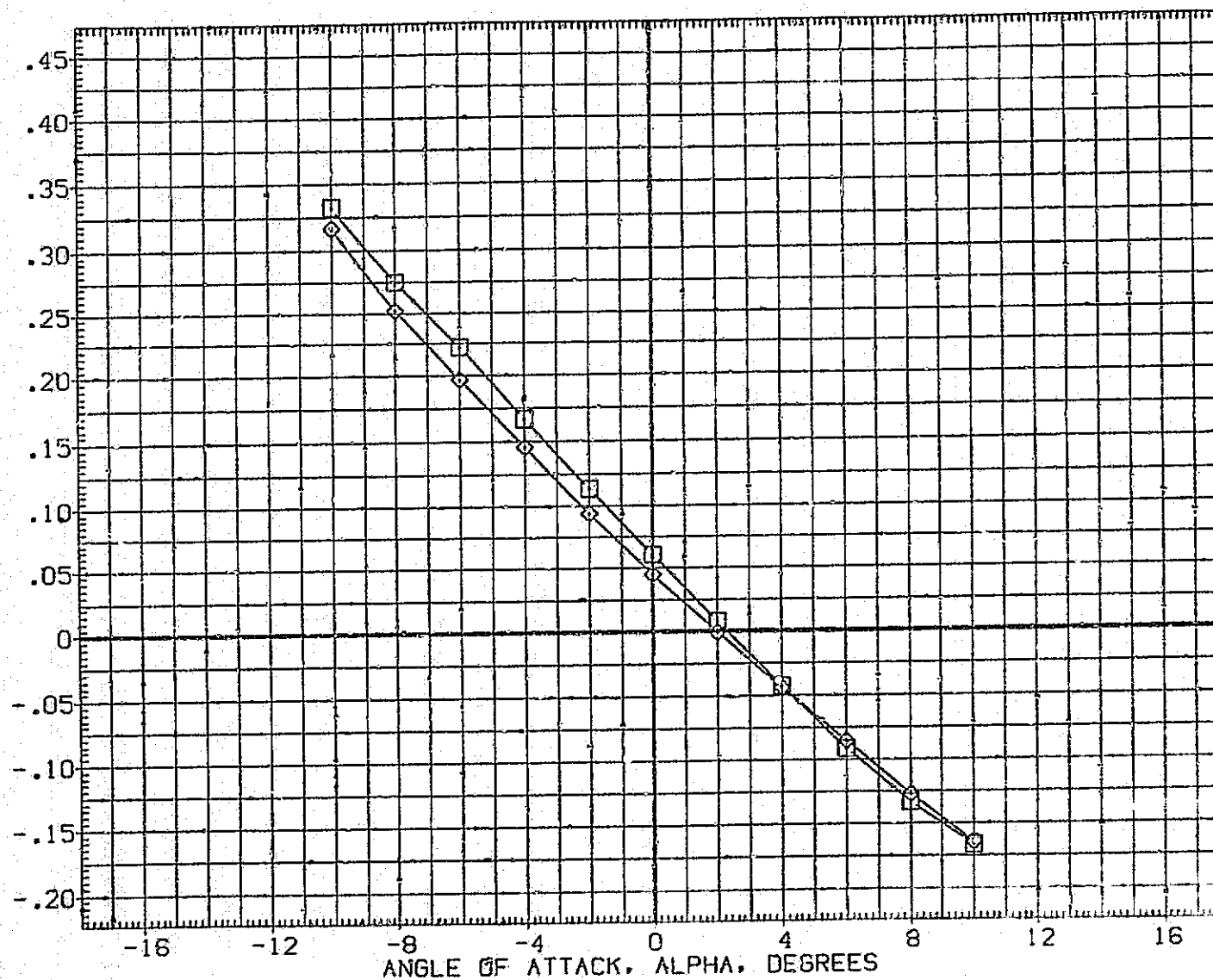


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(F)MACH = 1.46

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DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC035) □ DATA NOT AVAILABLE
 (VIC021) □ MSFC 594 (A33) 740TS (T2PIS3P20IF2) ORB STING
 (VIC007) ◇ MSFC 594 (A33) 740TS (T1PIS1P201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

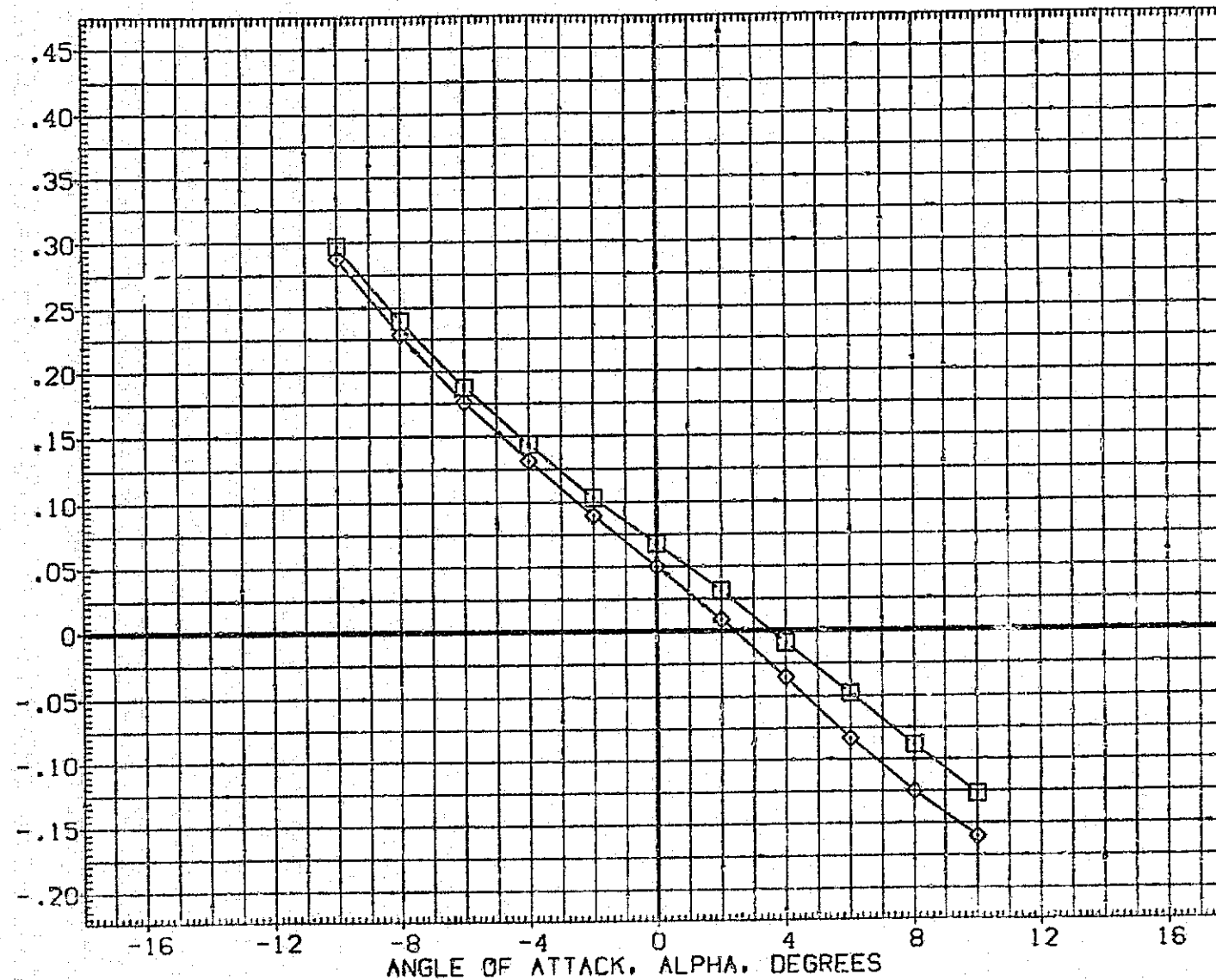


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(G)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

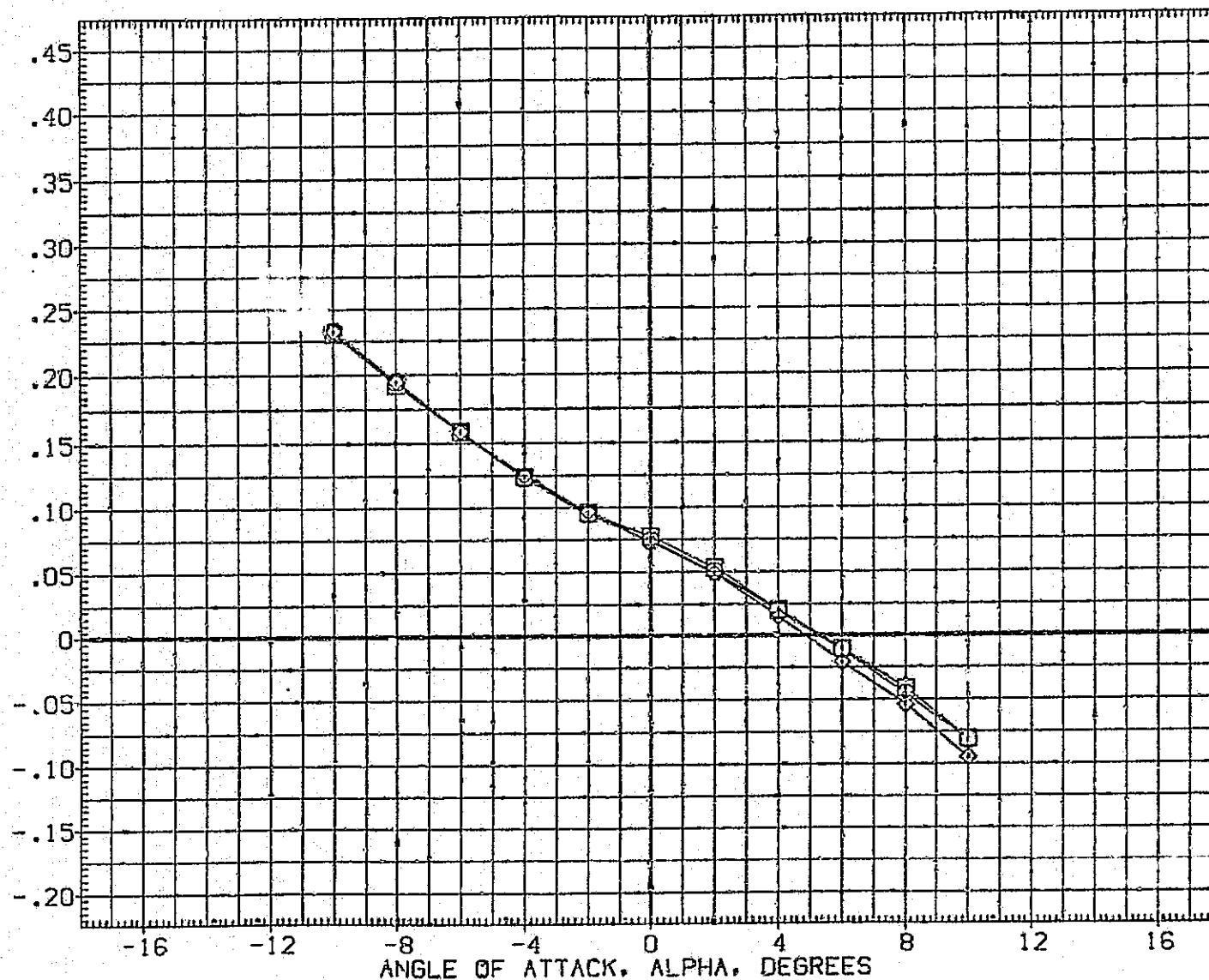


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LONGITUDINAL AERO

(H)MACH = 2.99

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035) □	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021) □	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007) ◇	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

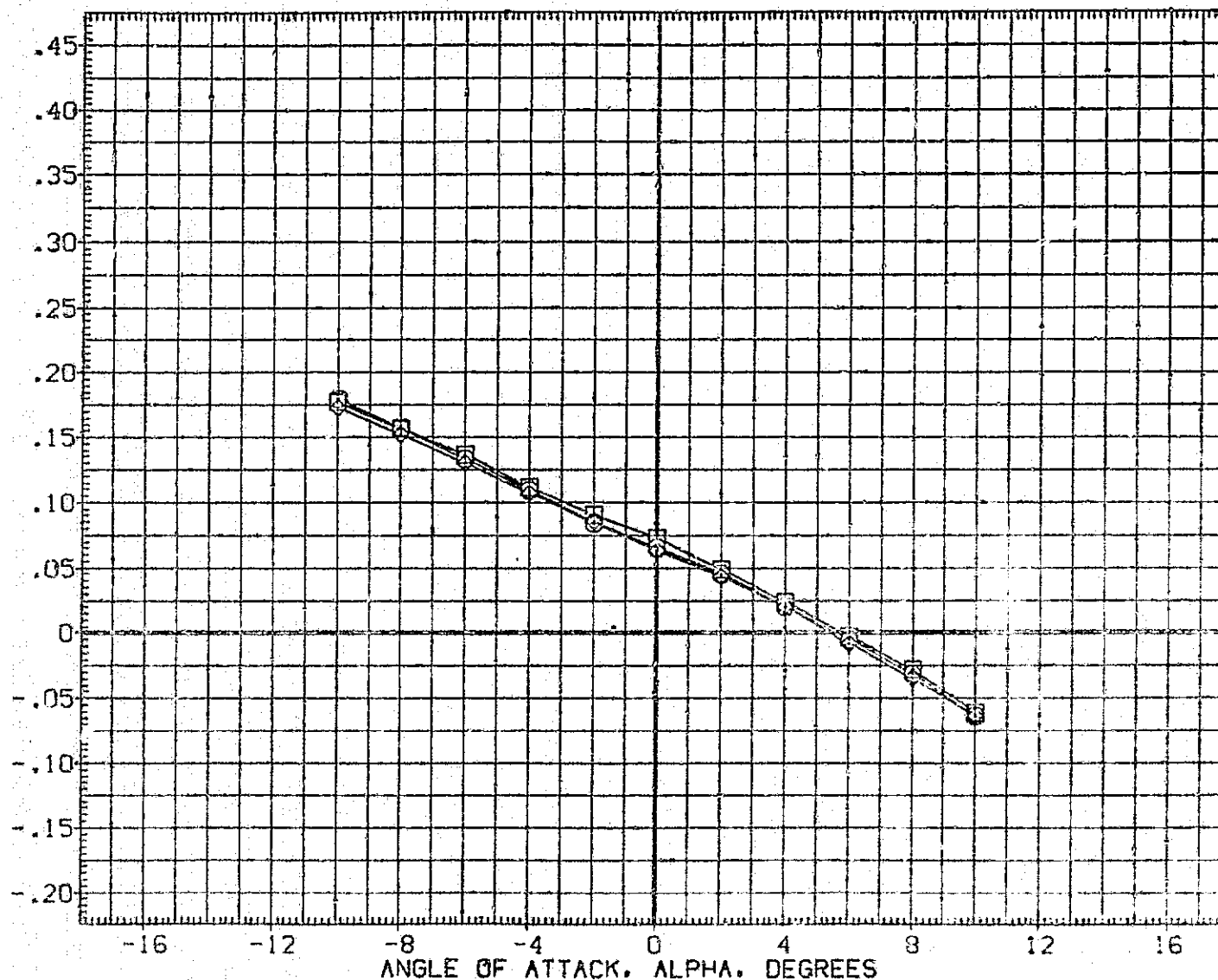


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(I)MACH = 4.96

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC035)	DATA NOT AVAILABLE	
(VIC021)	MSFC 594(A33) 740TS (T2P(S3P201F2)	ORB STING
(VIC007)	MSFC 594(A33) 740TS (T1P(S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

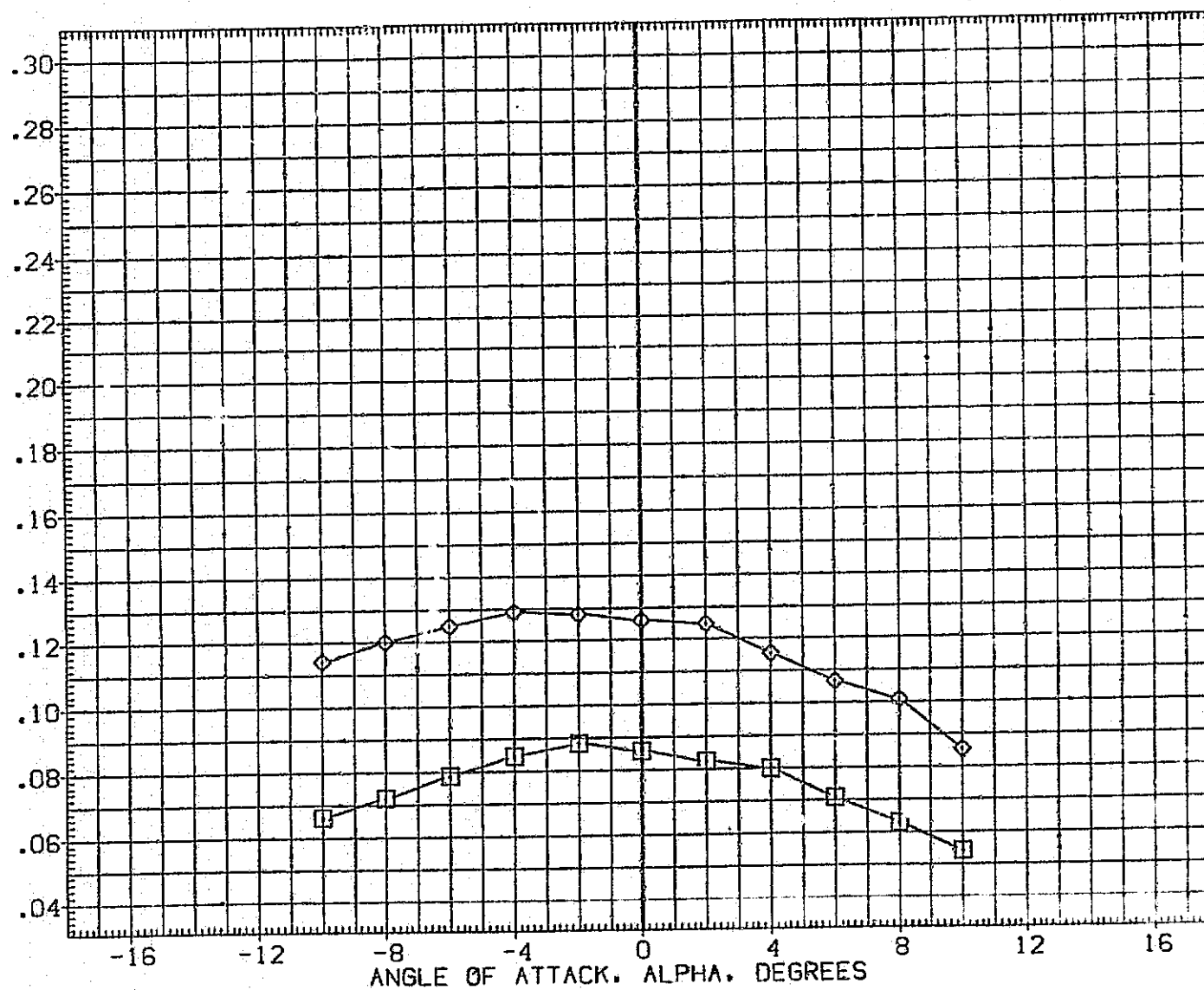


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(A)MACH = .60

DATA SET SYMBOL CONFIGURATION DESCRIPTION

[VIC035] □ DATA NOT AVAILABLE
 [VIC021] ◇ MSFC 594(A33) 740TS (T2P(S3P201F2) ORB STING
 [VIC007] ◇ MSFC 594(A33) 740TS (T1P(S1P201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

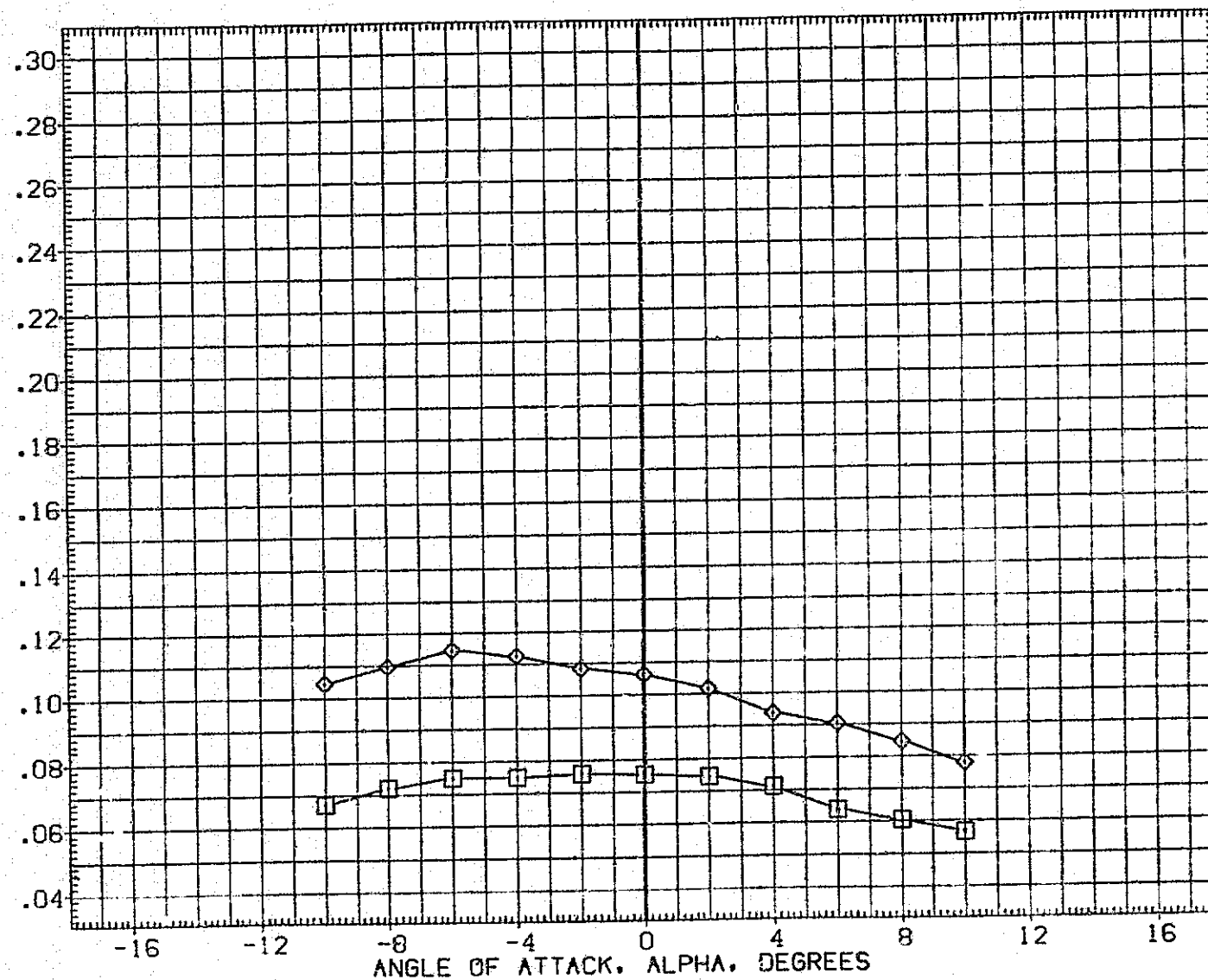


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(B)MACH = .80

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC035)	□	DATA NOT AVAILABLE	
(VIC021)	◇	MSFC 594(1A33) 740TS (T2P1S3P20IF2)	ORB STING
(VIC007)	◇	MSFC 594(1A33) 740TS (T1P1S1P20I)	ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

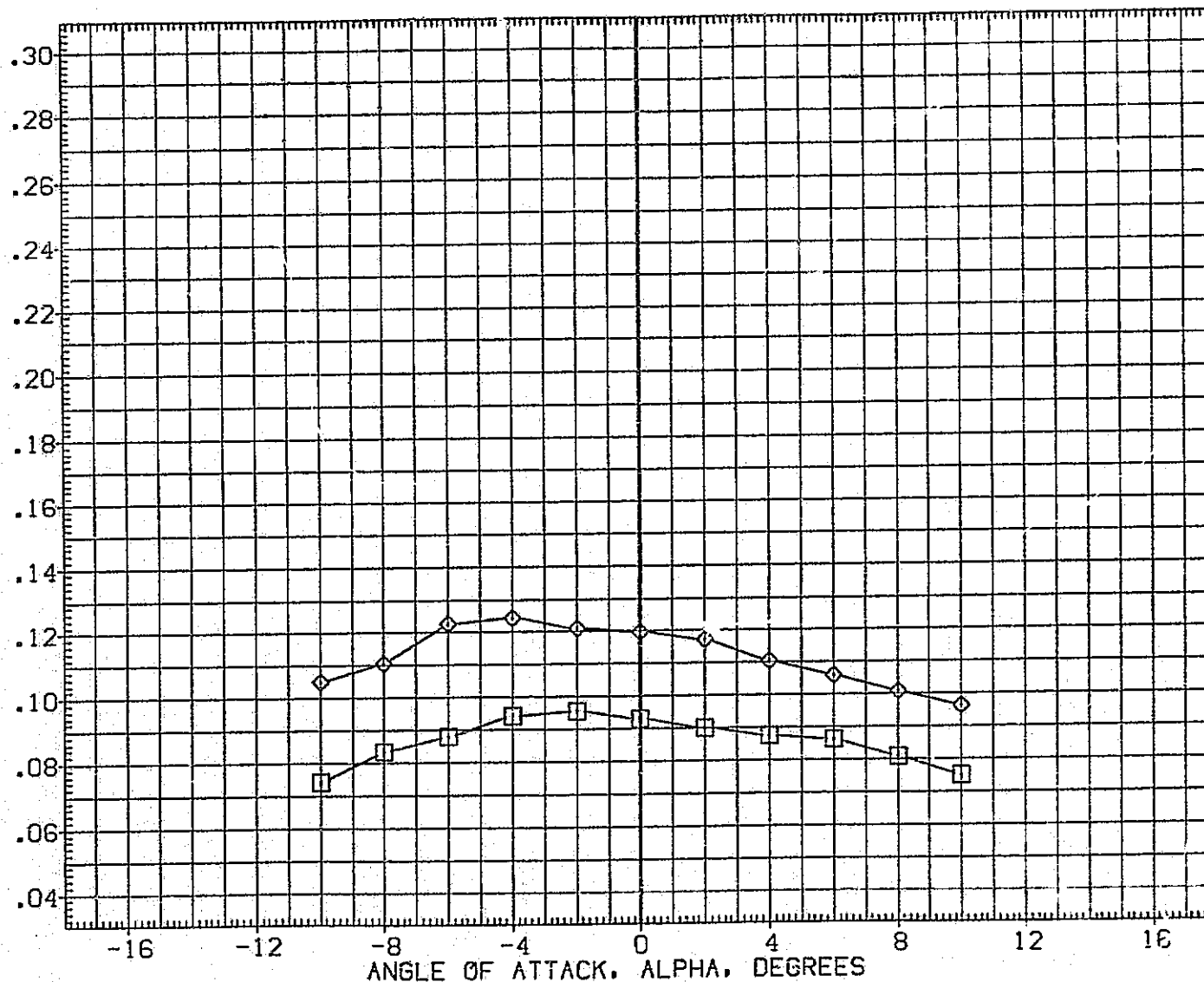


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(C)MACH = .90

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DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC035) □ DATA NOT AVAILABLE
 (VIC021) □ MSFC 594(1A33) 740TS (T2PIS3P201F2) ORB STING
 (VIC007) ◇ MSFC 594(1A33) 740TS (T1PIS1P201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

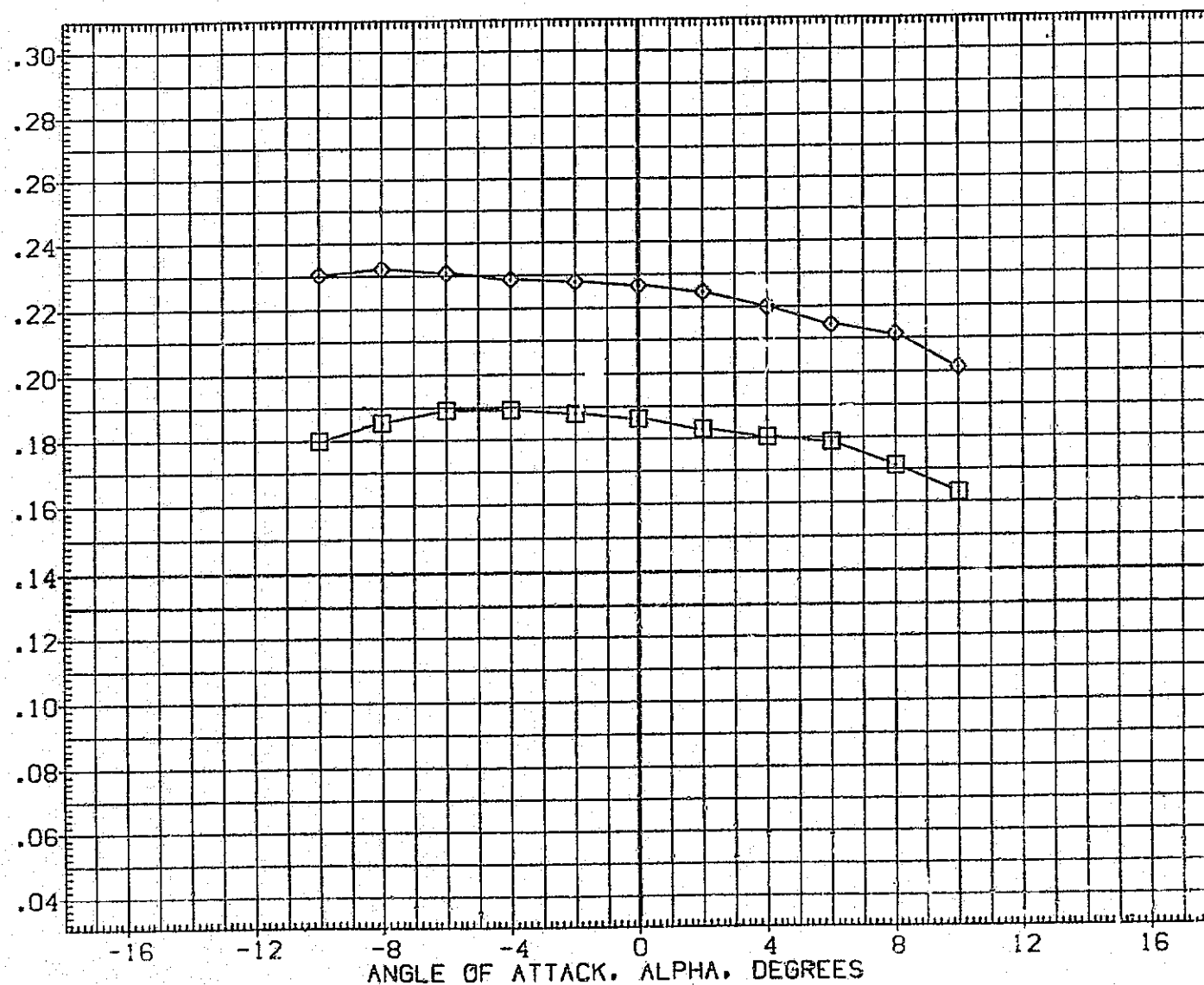


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(D)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC035)	DATA NOT AVAILABLE
(VIC021)	MSFC 594(IA33) 740TS (T2PIS3P201F2) ORB STING
(VIC007)	MSFC 594(IA33) 740TS (T1PIS1P201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

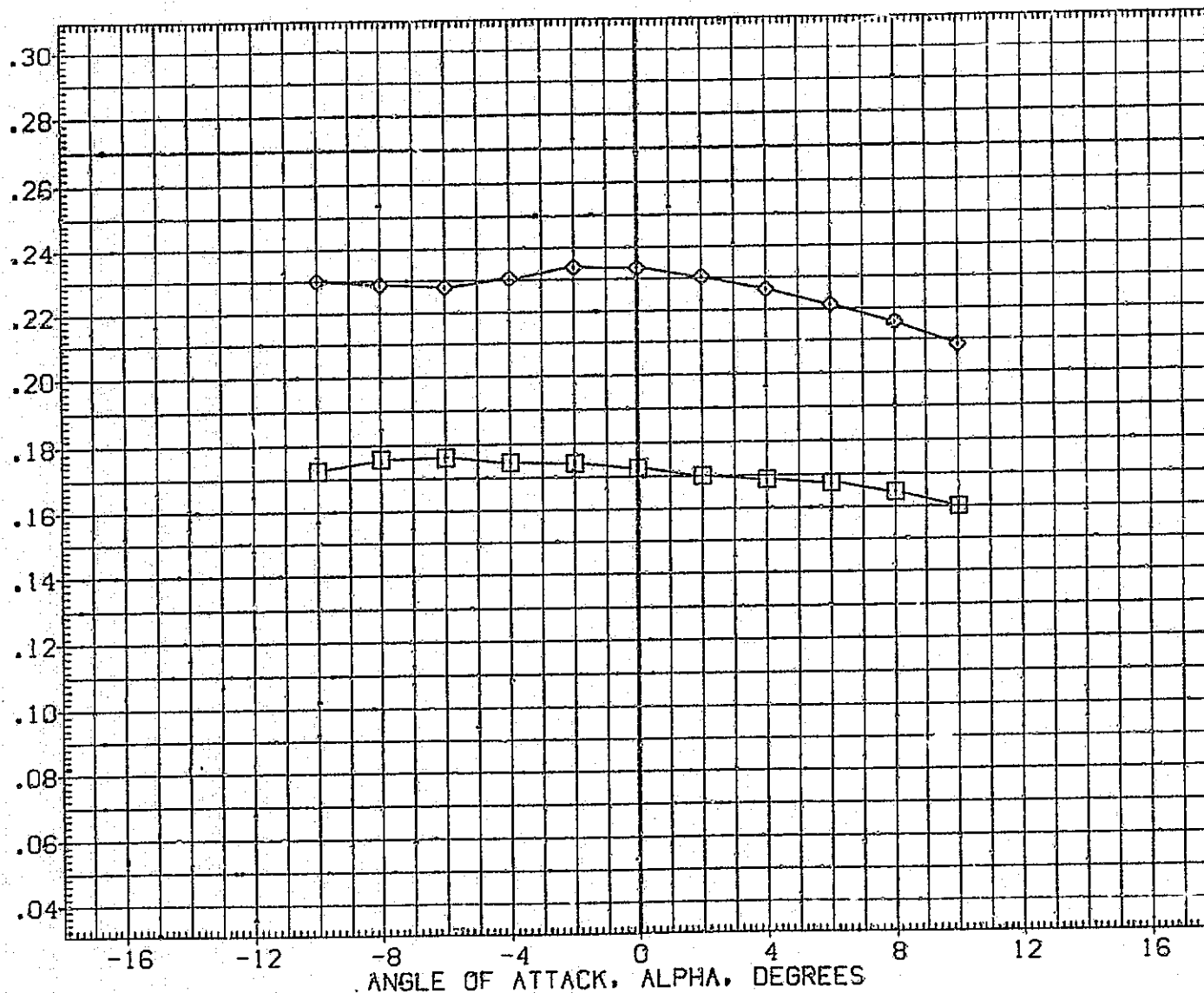


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(E)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC035)	DATA NOT AVAILABLE	
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB SYING

REFERENCE INFORMATION

SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

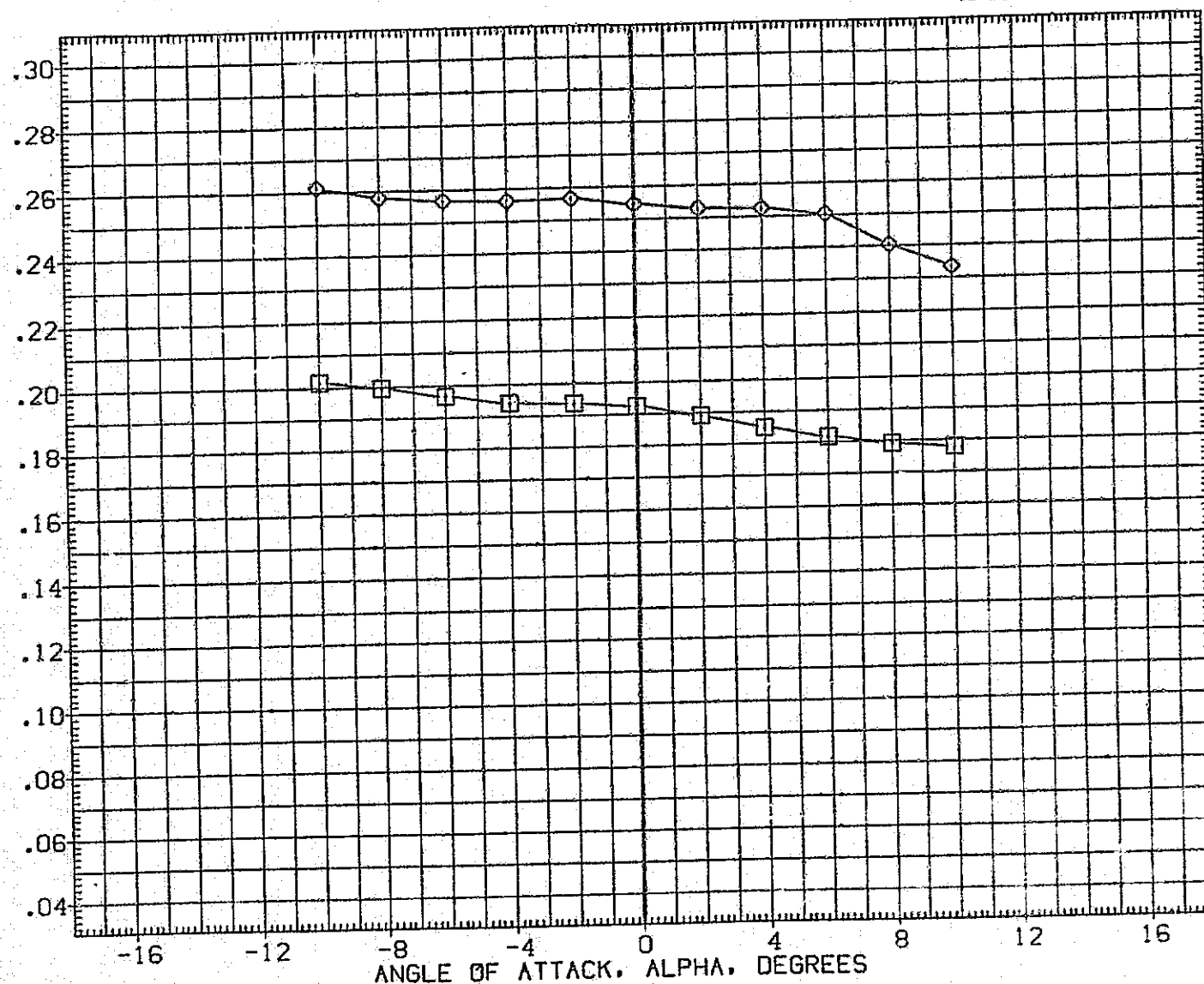


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(F)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
{VIC035}	DATA NOT AVAILABLE
{VIC021}	MSFC 594(IA33) 740TS (T2P1S3P201F2) ORB STING
{VIC007}	MSFC 594(IA33) 740TS (T1P1S1P201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

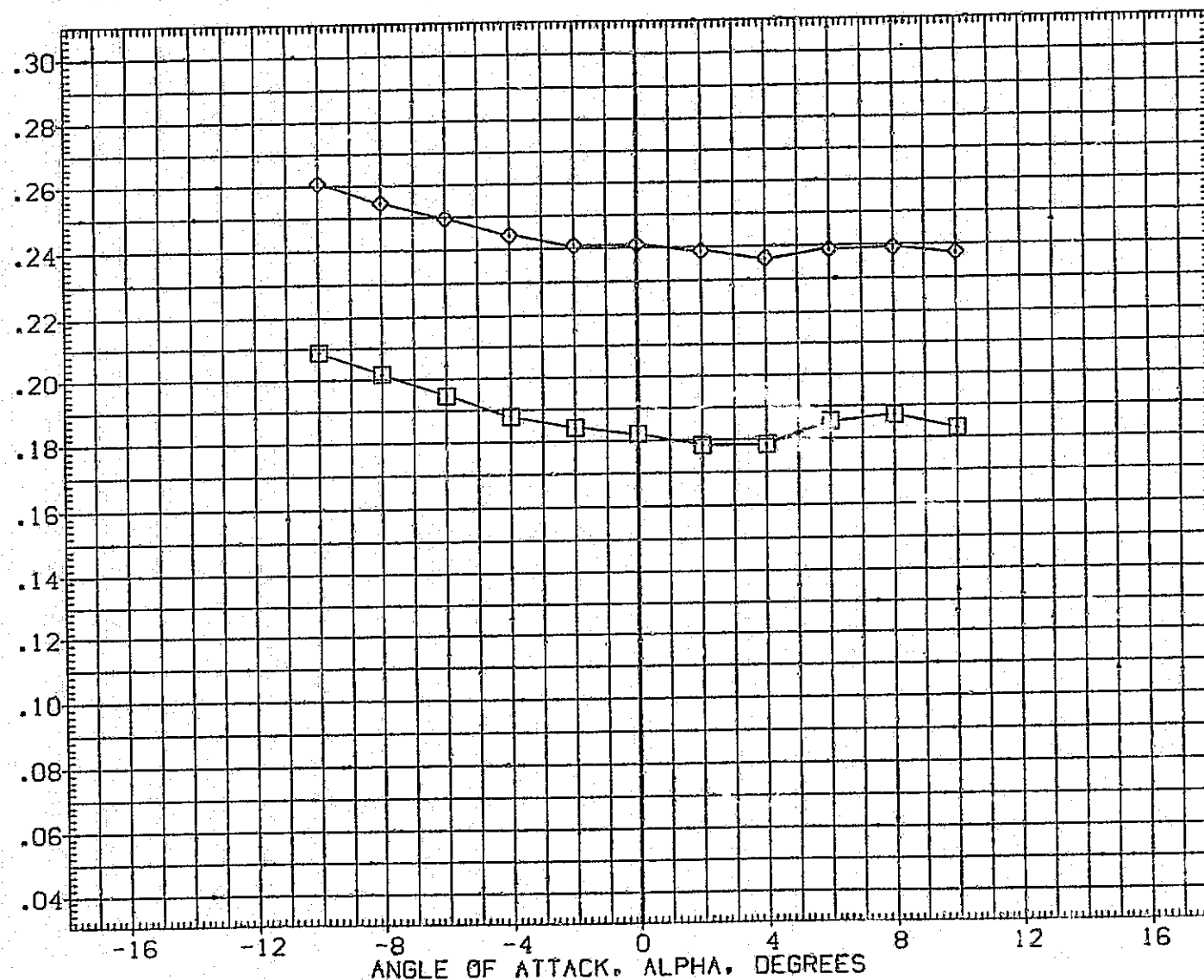


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(G)MACH = 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(A33) 740TS (TIPIS3P20IF2)	ORB STING
(VIC021)	MSFC 594(A33) 740TS (T2PIS3P20IF2)	ORB STING
(VIC007)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

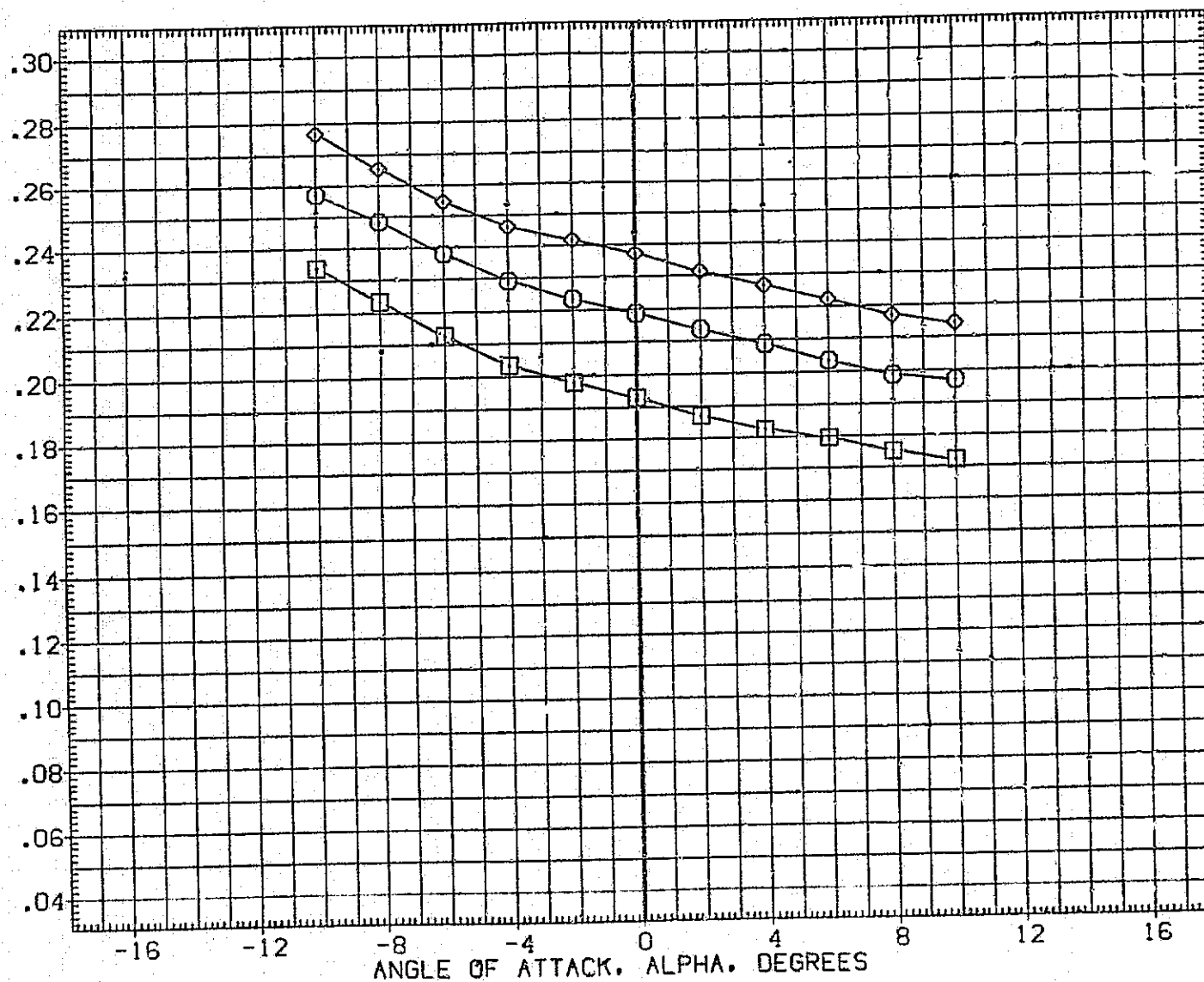


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(H)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

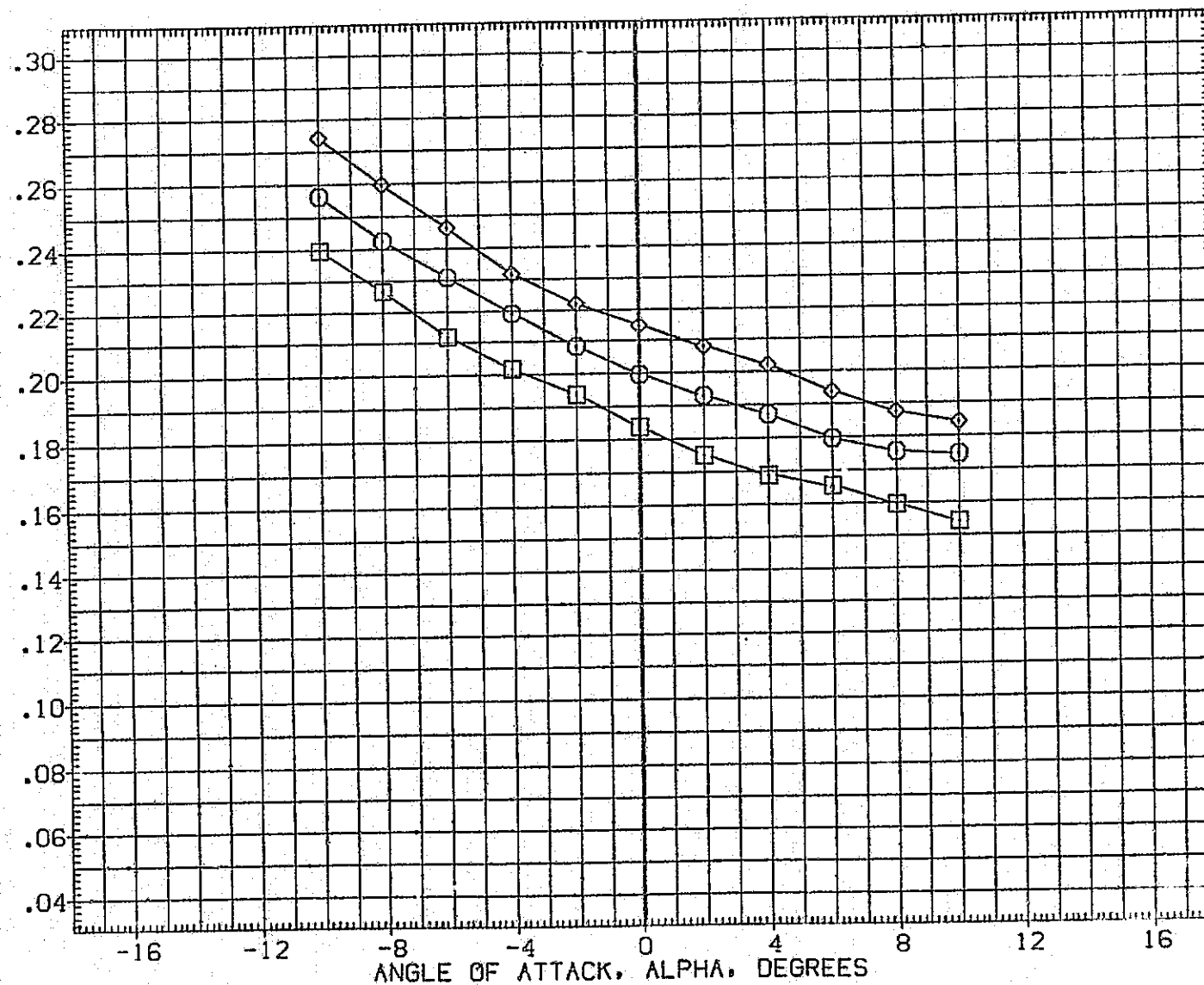


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(1)MACH = 4.96

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DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC035) □ DATA NOT AVAILABLE
 (VIC021) ◇ MSFC S94(A33) 740TS (T2P1S3P201F2) ORB STING
 (VIC007) ◇ MSFC S94(A33) 740TS (T1P1S1P201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

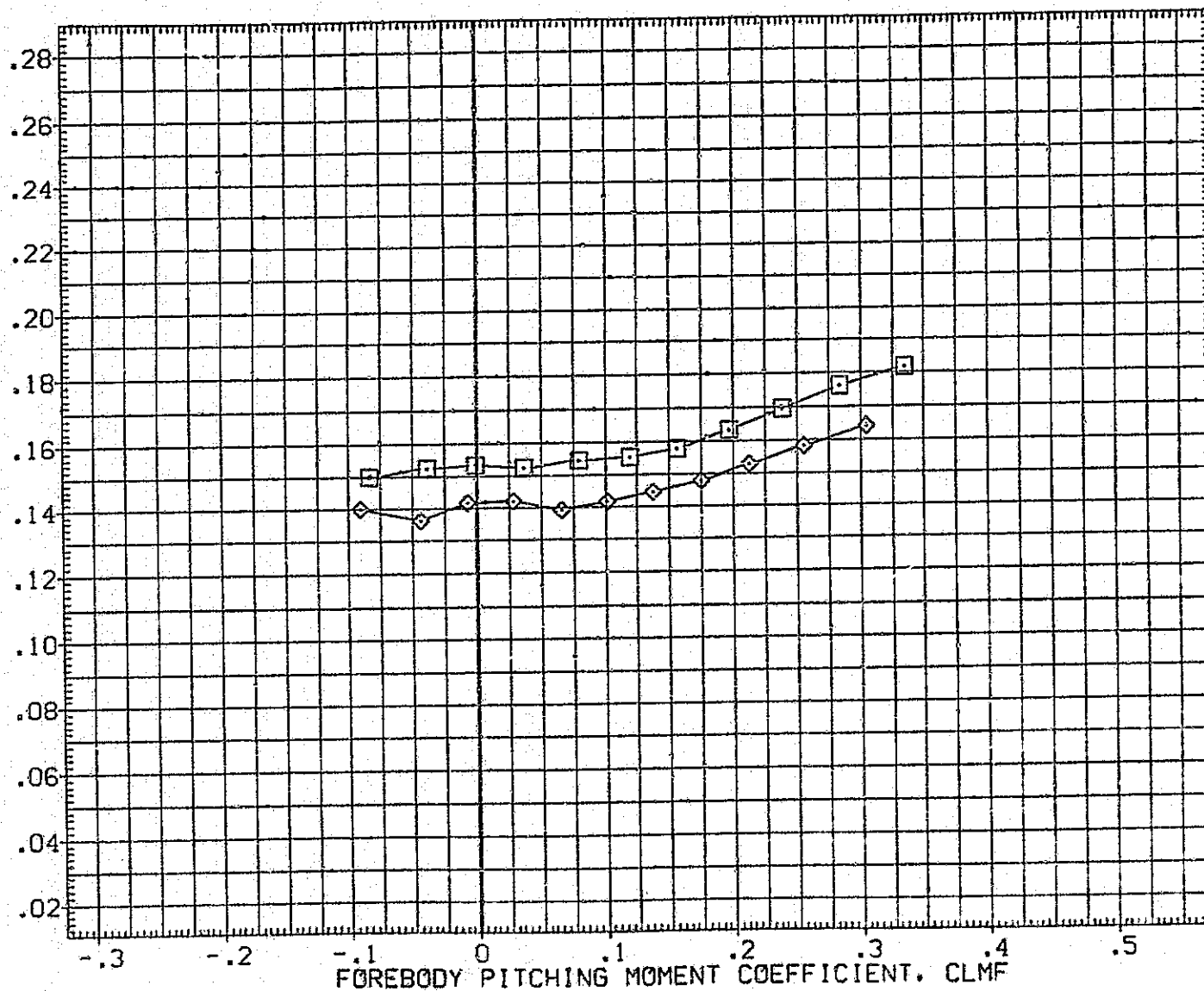


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LONGITUDINAL AERO

(A)MACH = .60

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (VIC035) □ DATA NOT AVAILABLE
 (VIC021) □ MSFC 594(1A33) 740TS (T2PIS3P201F2) ORB STING
 (VIC007) ◇ MSFC 594(1A33) 740TS (T1PIS1P201) ORB STING

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

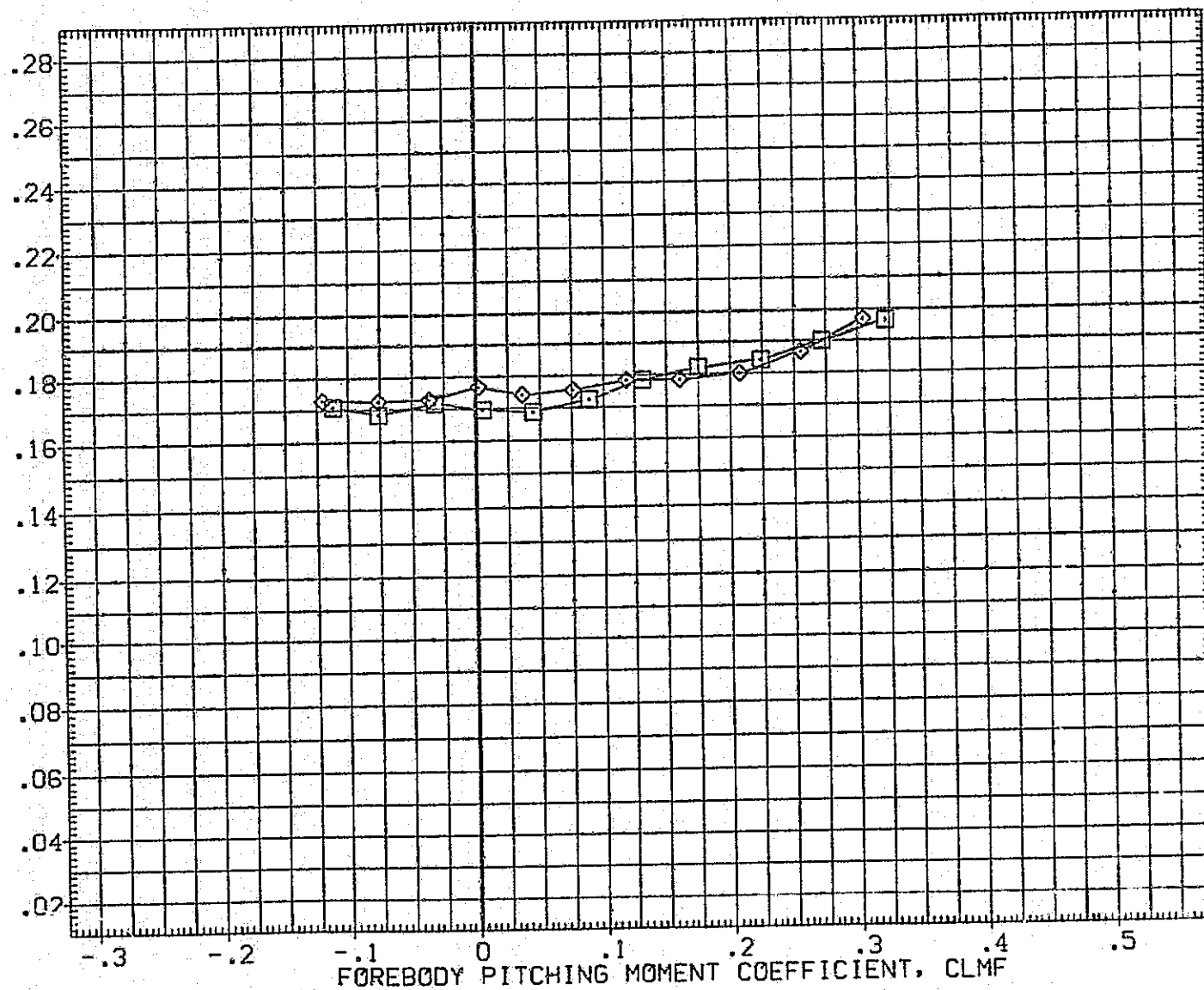


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
 (B)MACH = .80

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC035) □ DATA NOT AVAILABLE
 (VIC021) □ MSFC 594(1A33) 740TS (T2PIS3P20IF2) ORB STING
 (VIC007) ◇ MSFC 594(1A33) 740TS (T1PIS1P20I) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

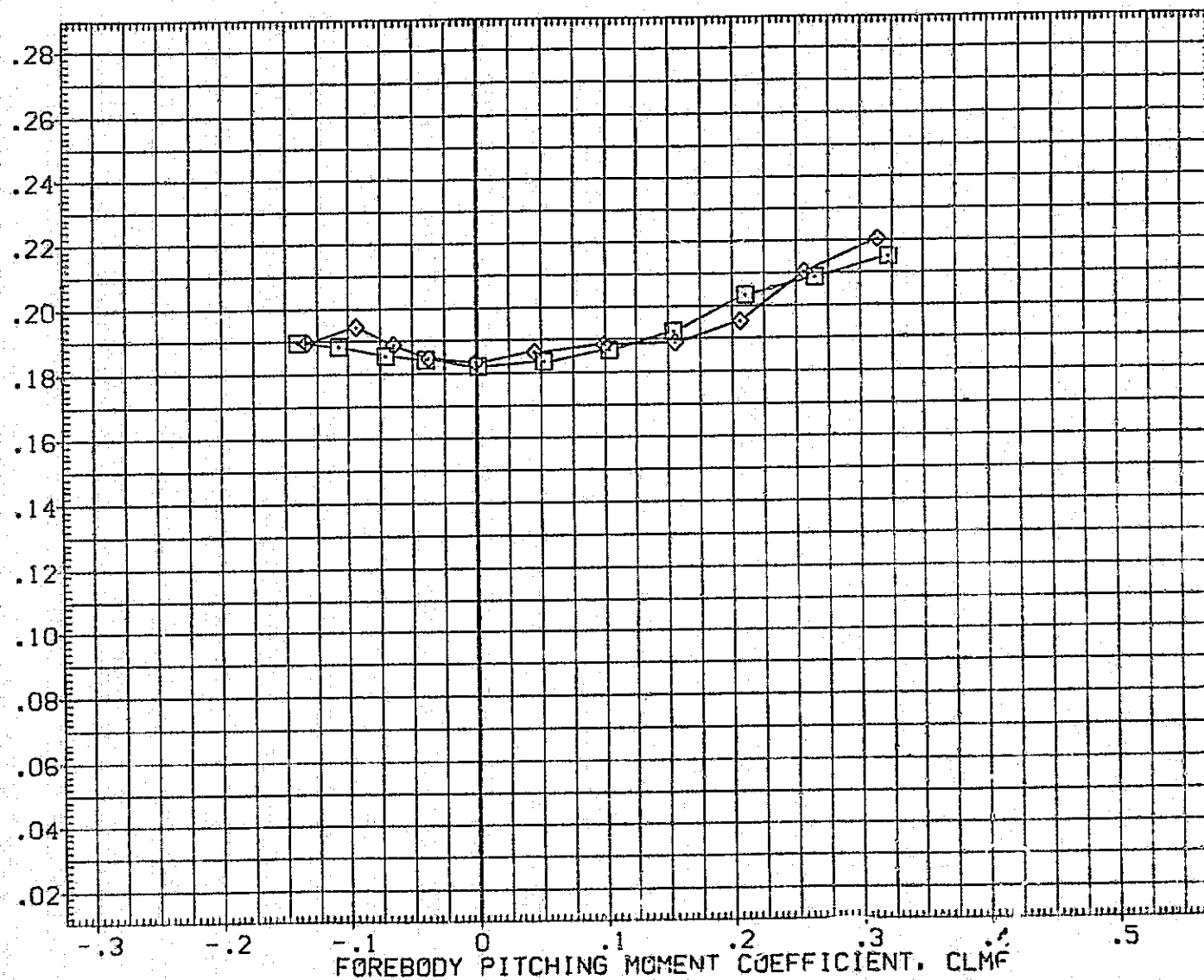


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC035)	DATA NOT AVAILABLE	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

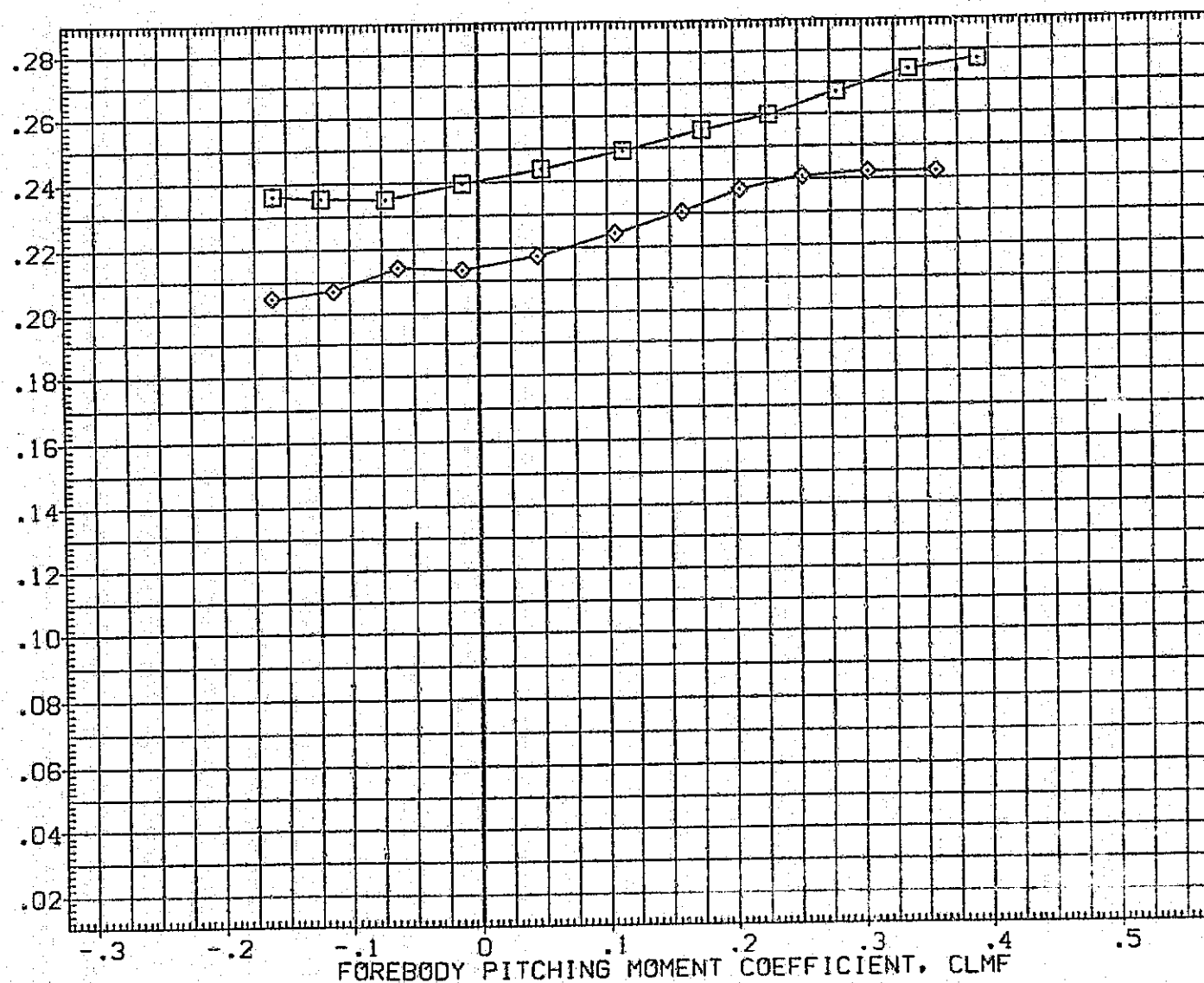


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LONGITUDINAL AERO
(D)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC035)	DATA NOT AVAILABLE
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2) ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB. ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

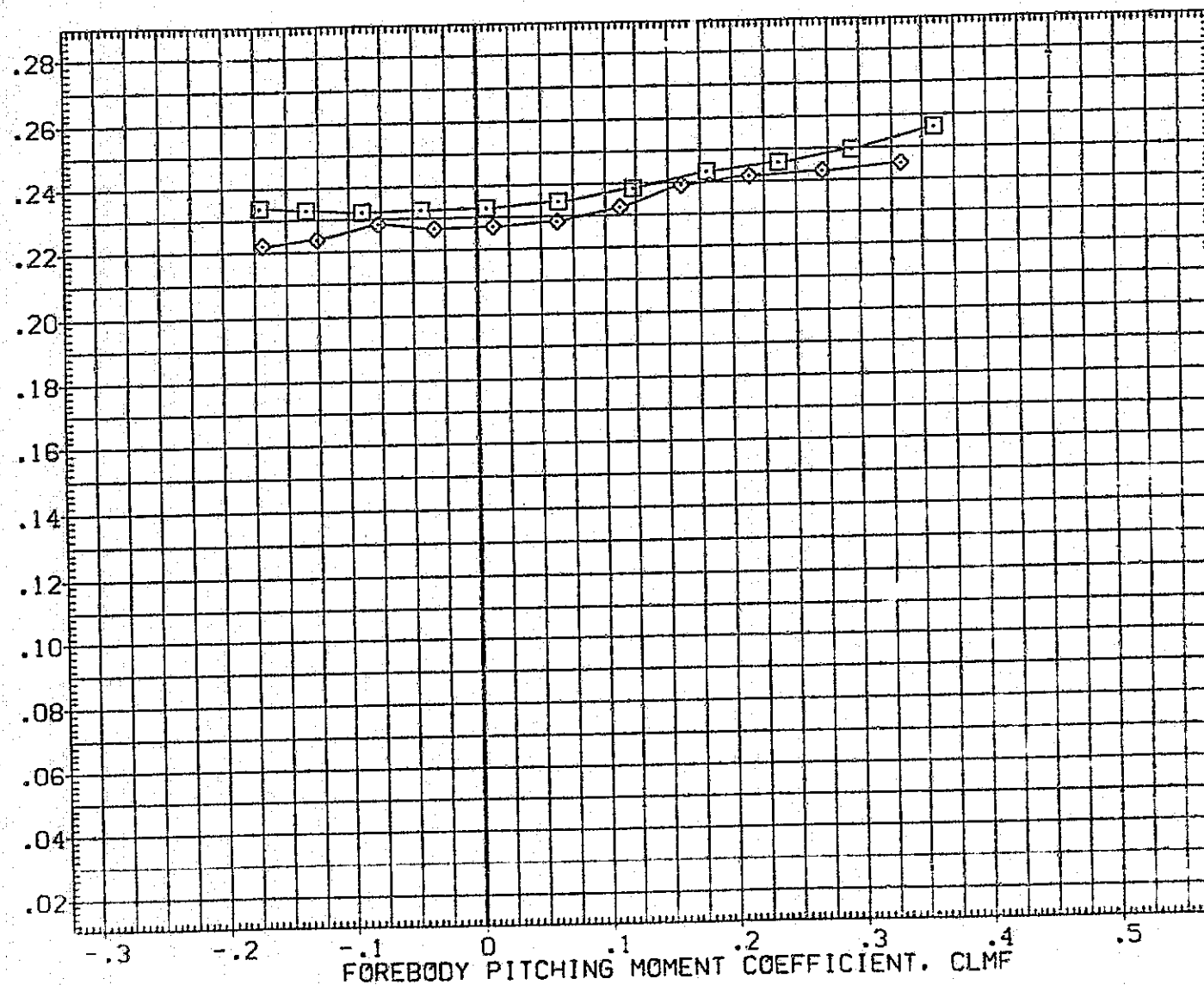


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(E)MACH 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC035)	DATA NOT AVAILABLE
(VIC021)	MSFC 594(1A33) 740TS (T2PIS3P201F2) ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1PIS1P201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

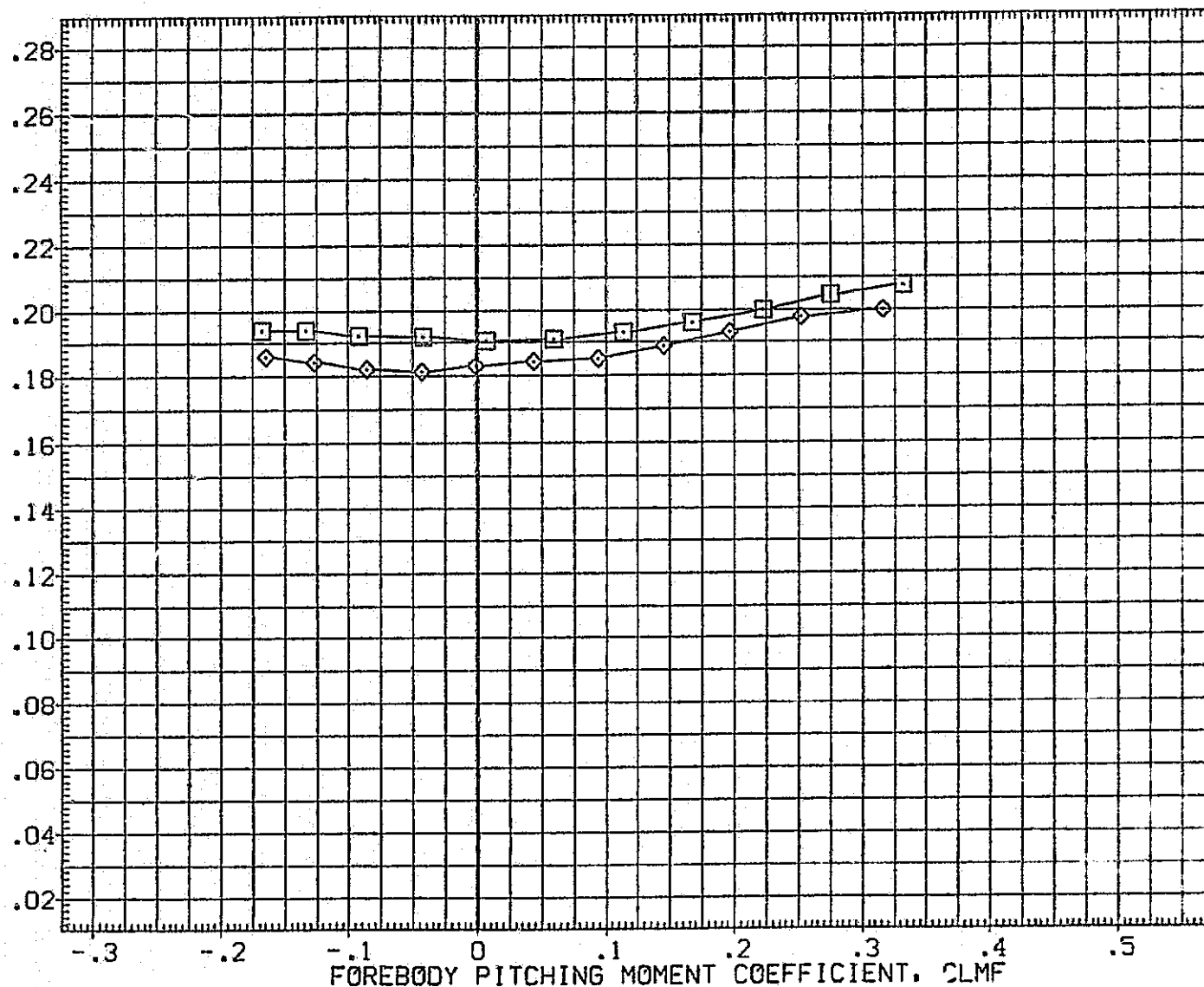


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(F)MACH = 1.46

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC035) DATA NOT AVAILABLE
 (VIC021) MSFC 594(1A33) 740TS (T2P1S3P201F2) ORB STING
 (VIC007) MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1293.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

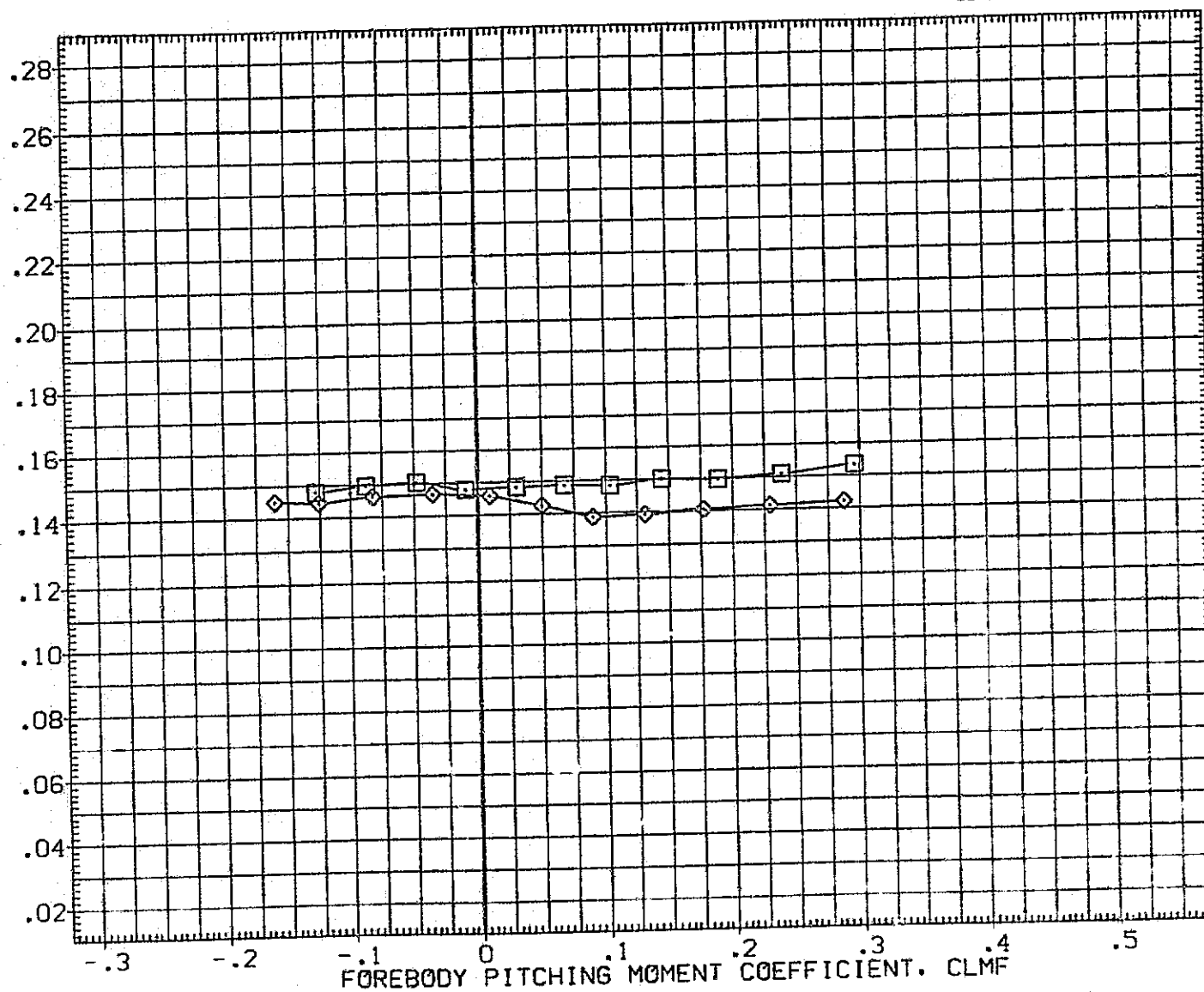


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
 (G)MACH - 1.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(V1C035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(V1C021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(V1C007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB. ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

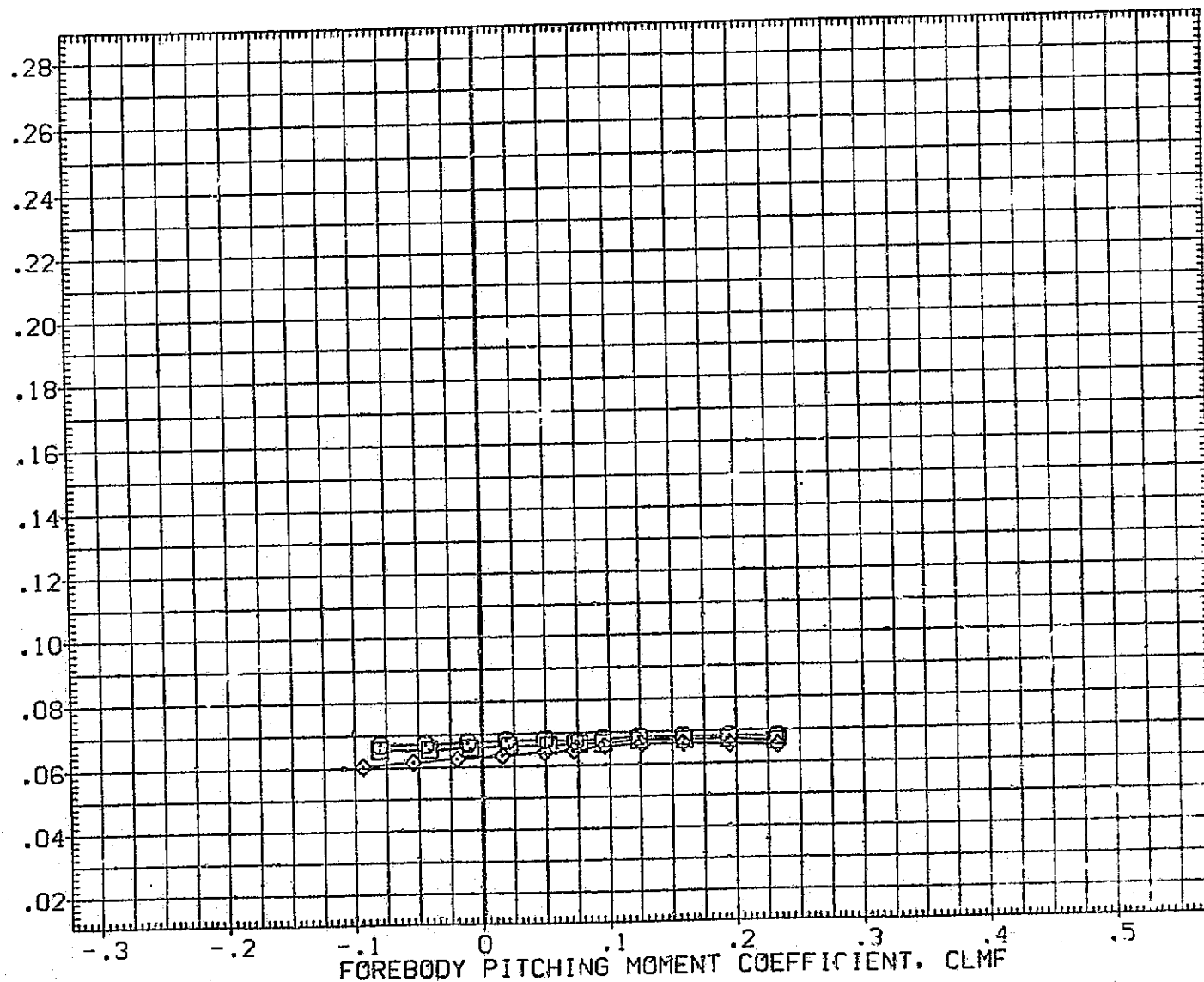


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
 (H)MACH = 2.99

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1PIS3P20IF2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2PIS3P20IF2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1PIS1P20I)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

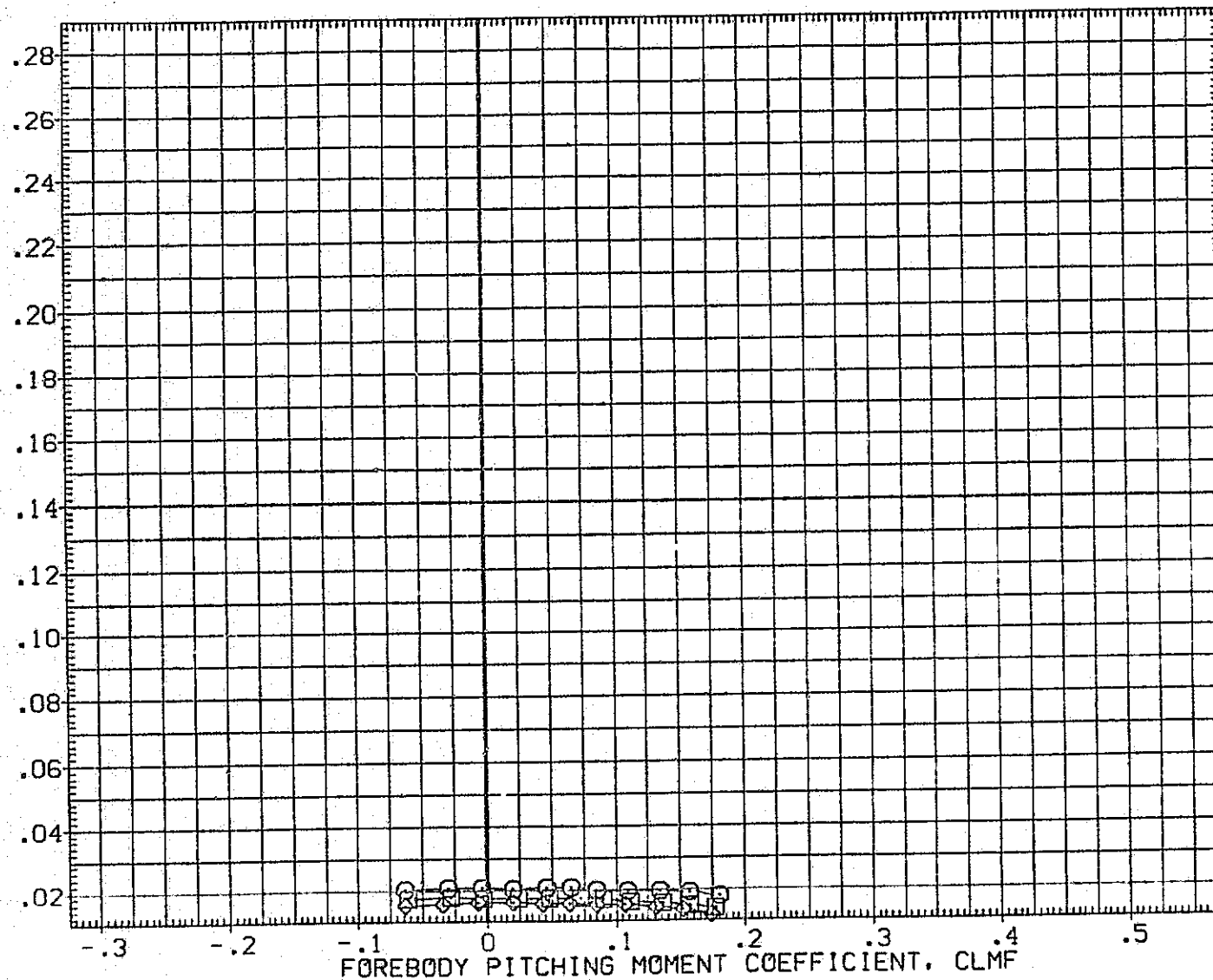


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
[VIC035]	DATA NOT AVAILABLE	ORB STING
[VIC021]	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
[VIC007]	MSFC 594(1A33) 740TS (T1P1S1P201)	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

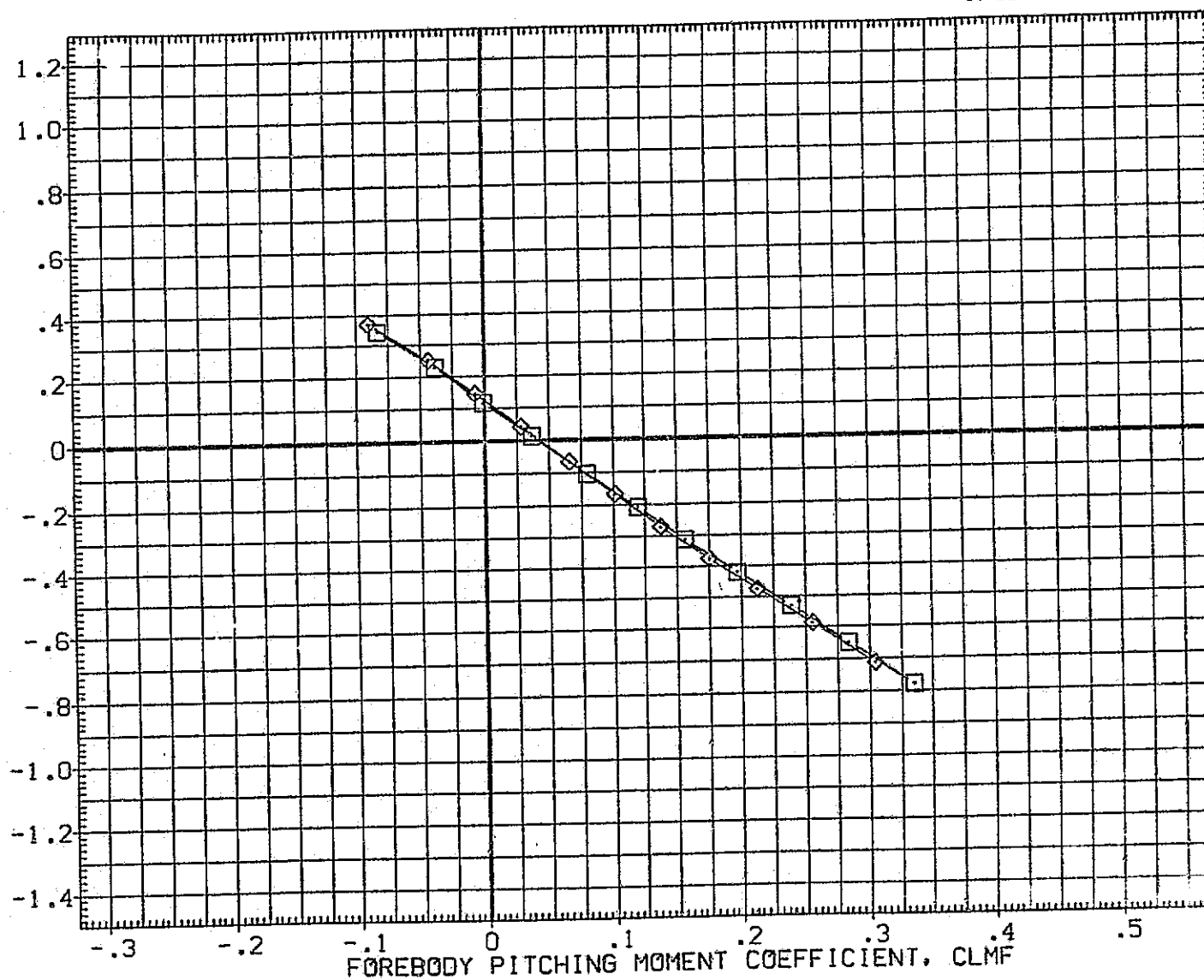


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC035)	DATA NOT AVAILABLE	
(VIC021)	MSFC 594(1A33) 740TS (T2P1S9P20IF2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P20I)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

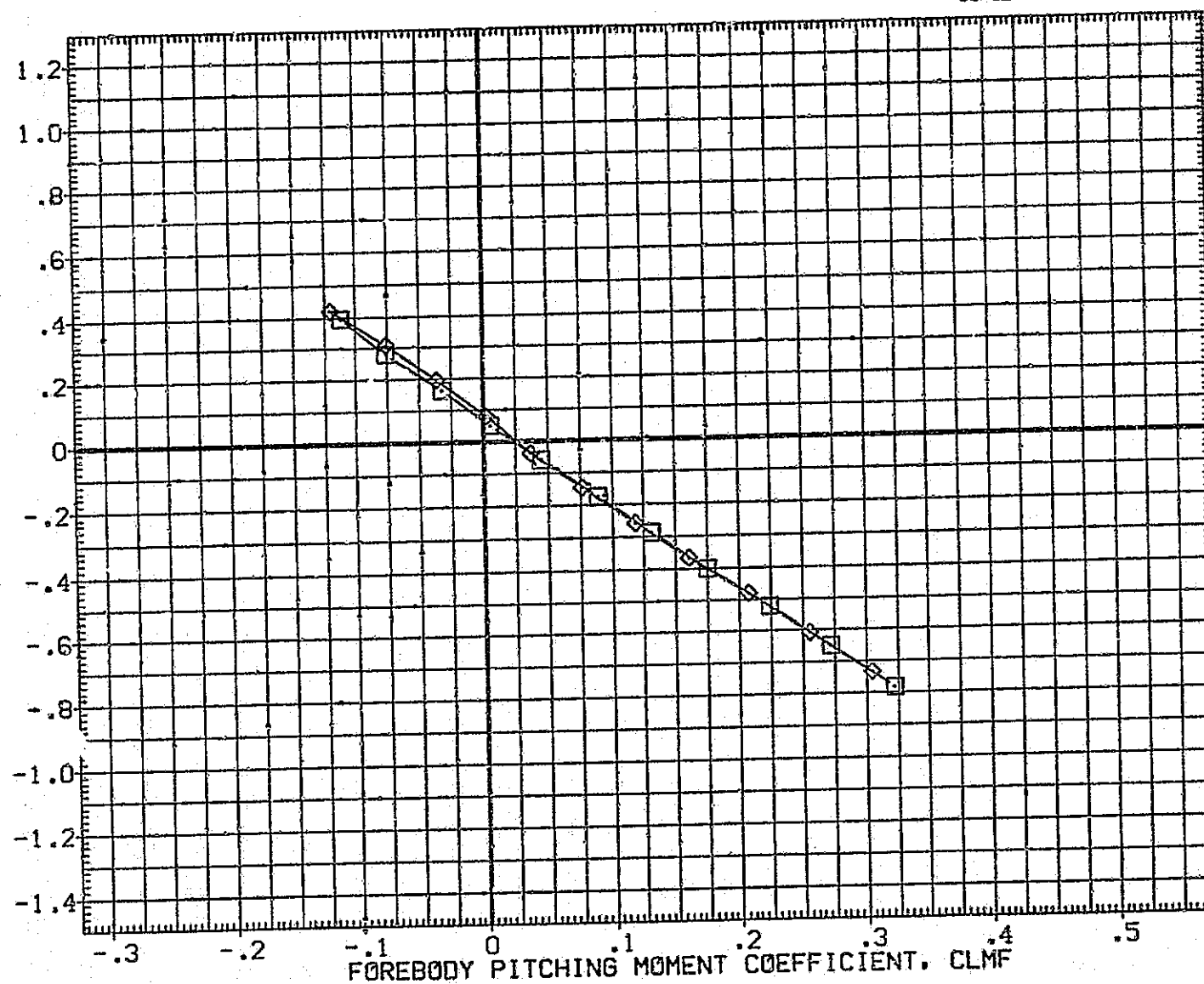


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(B)MACH = .80

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC035) DATA NOT AVAILABLE
 (VIC021) MSFC 594(1A33) 740TS (T2P1S3P201F2) ORB STING
 (VIC007) MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1250.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

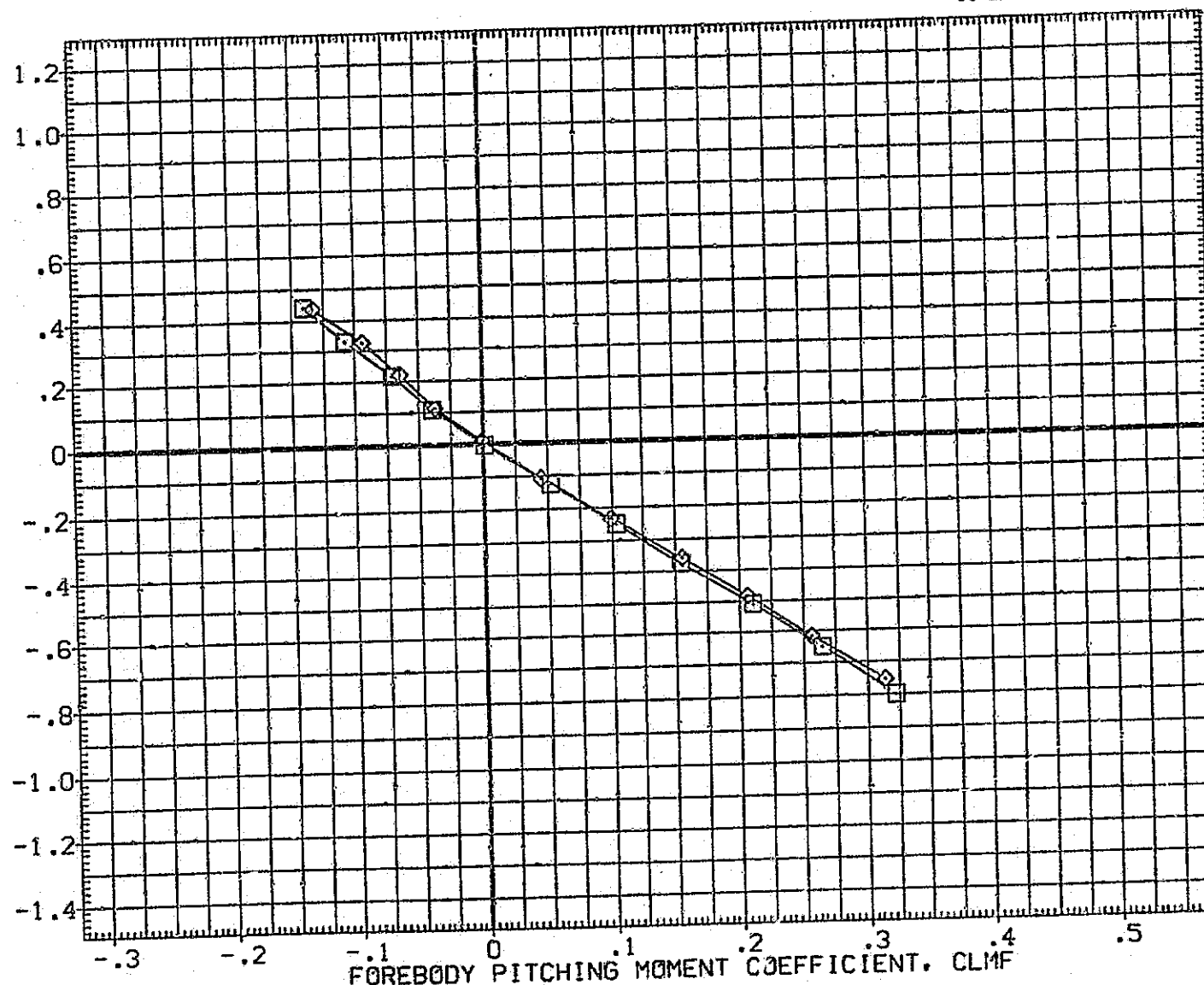


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(C)MACH = .90

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC035) ○ DATA NOT AVAILABLE
 (VIC021) □ MSFC 594(1A33) 740TS (T2PIS3P201F2) ORB STING
 (VIC007) ◇ MSFC 594(1A33) 740TS (T1PIS1P201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

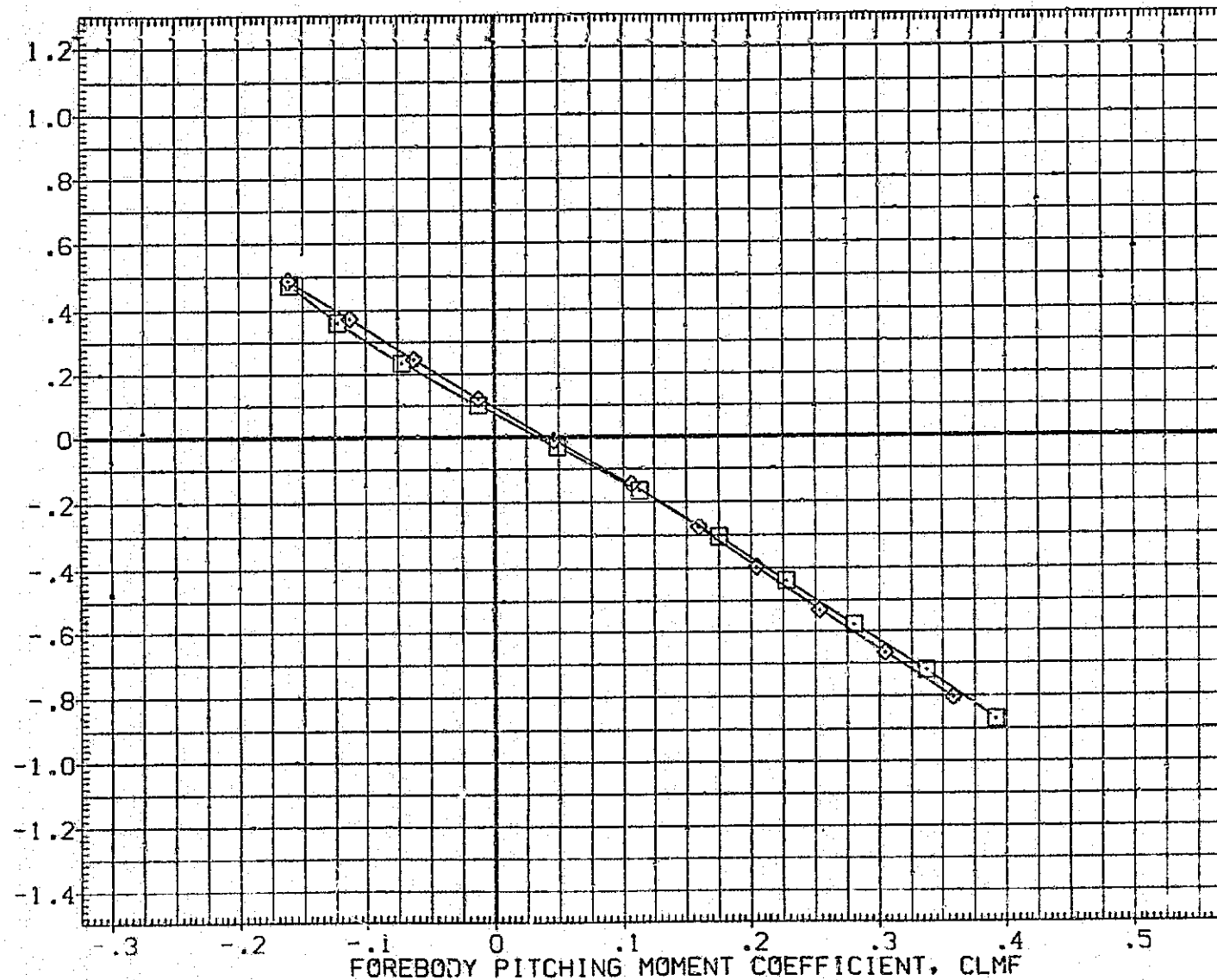


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC035)	DATA NOT AVAILABLE	
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

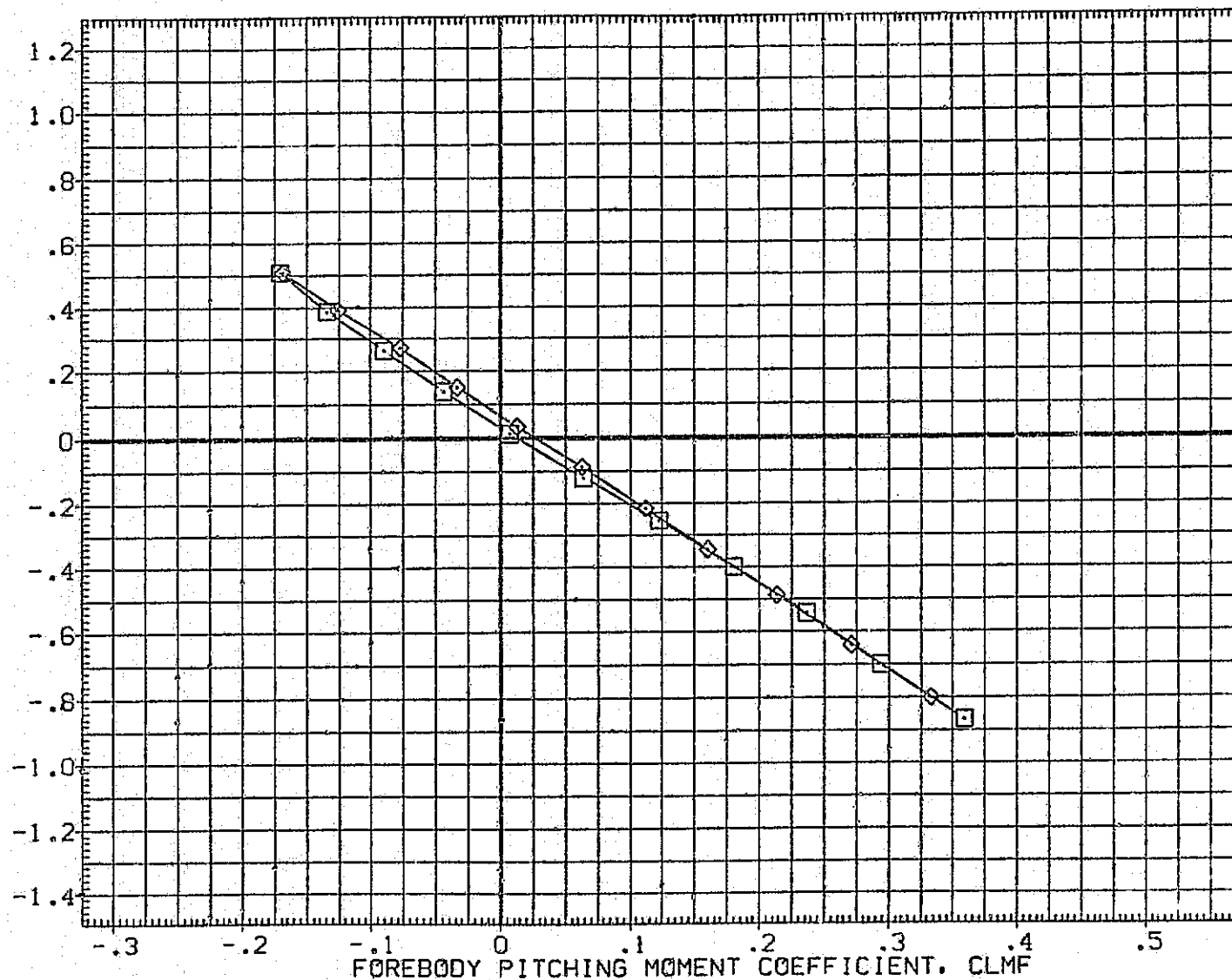


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(E)MACH 1.25

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DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC035) ○ DATA NOT AVAILABLE
 (VIC021) □ MSFC 594(A33) 740TS (T2PIS3P201F2) ORB STING
 (VIC007) ◇ MSFC 594(A33) 740TS (T1PIS1P201) ORB STING

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 YMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

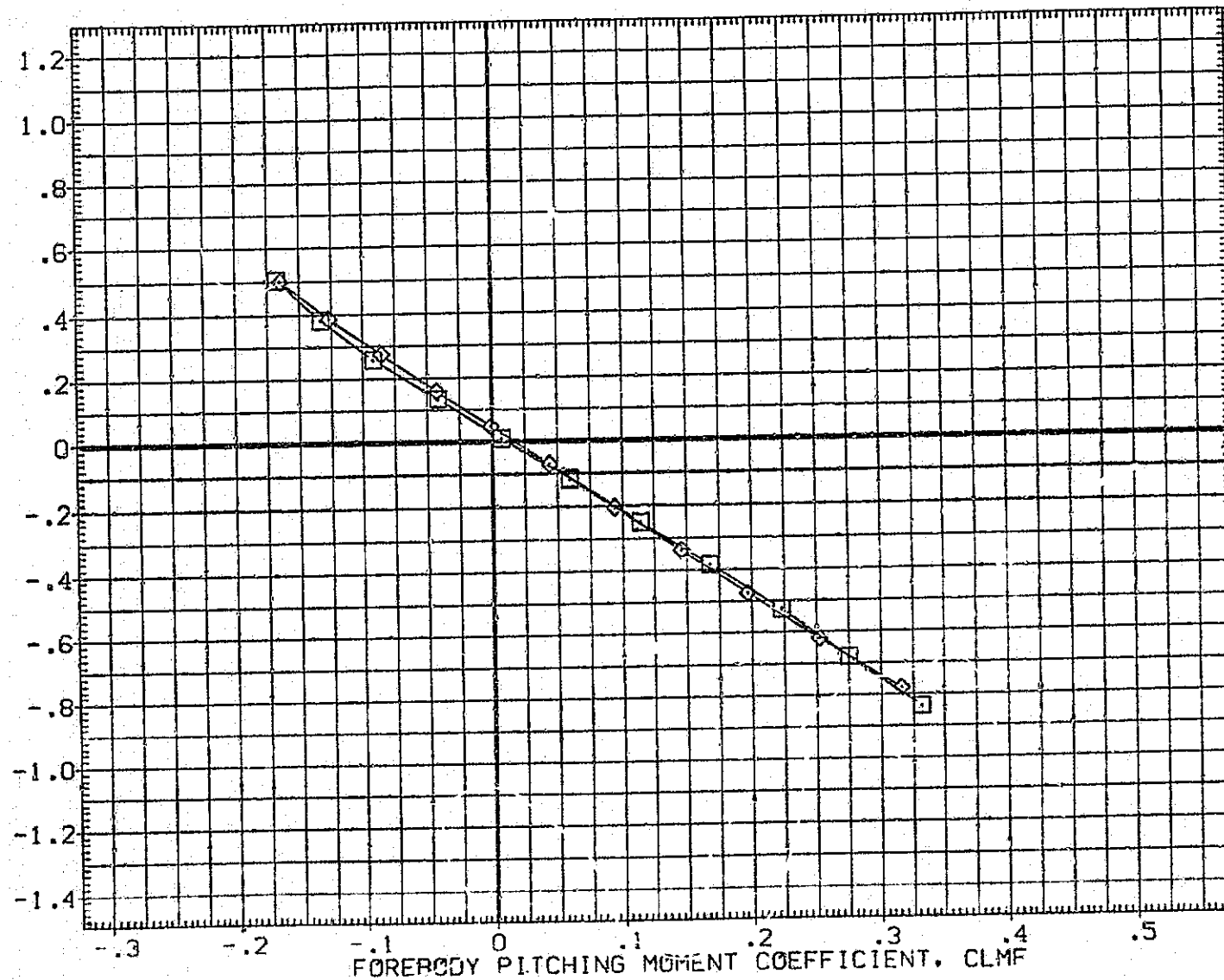


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
 (F)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
[VIC035]	DATA NOT AVAILABLE	
[VIC021]	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING
[VIC007]	MSFC 594(1A33) 740TS (T1PIS1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

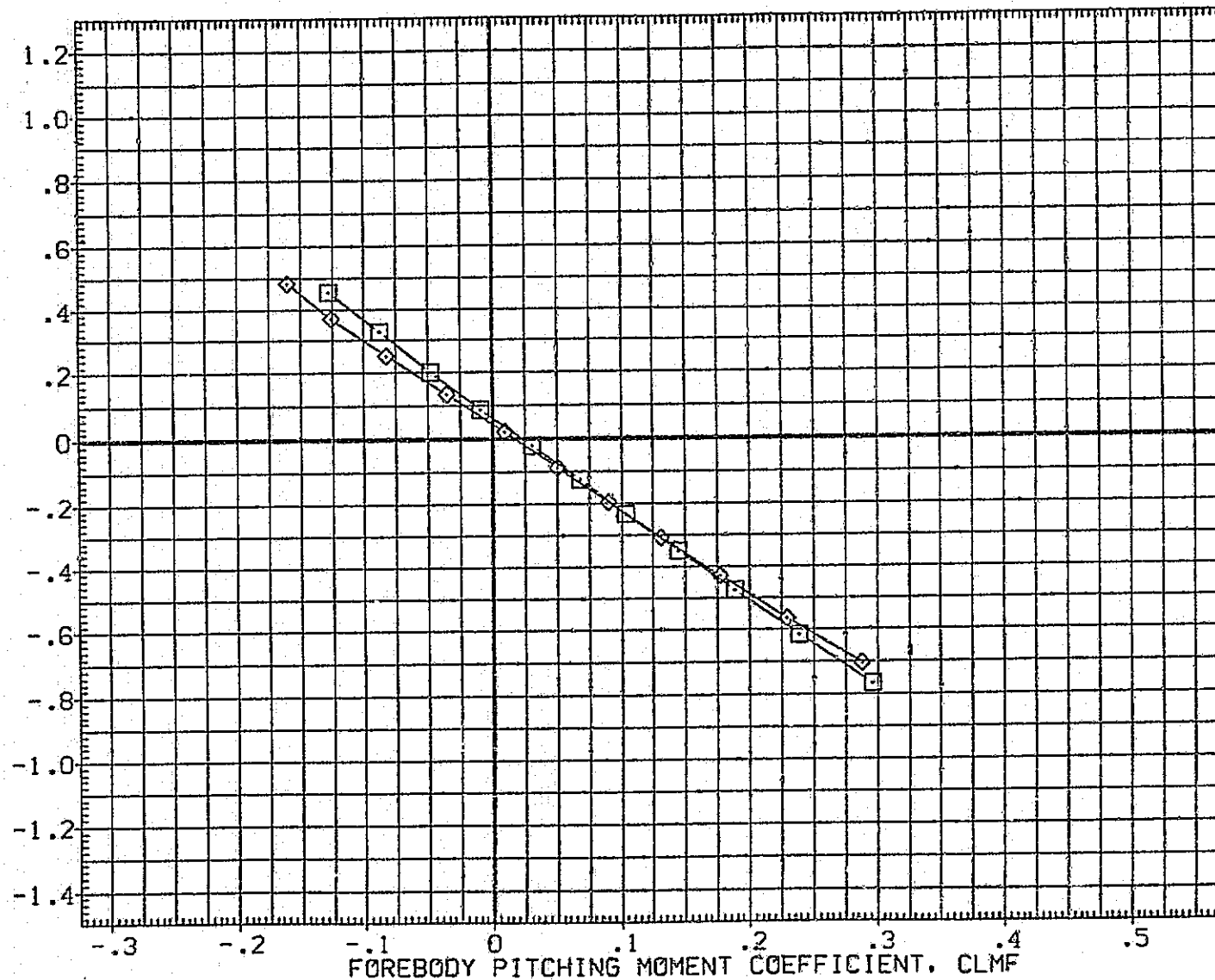


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(G)MACH = 1.96

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

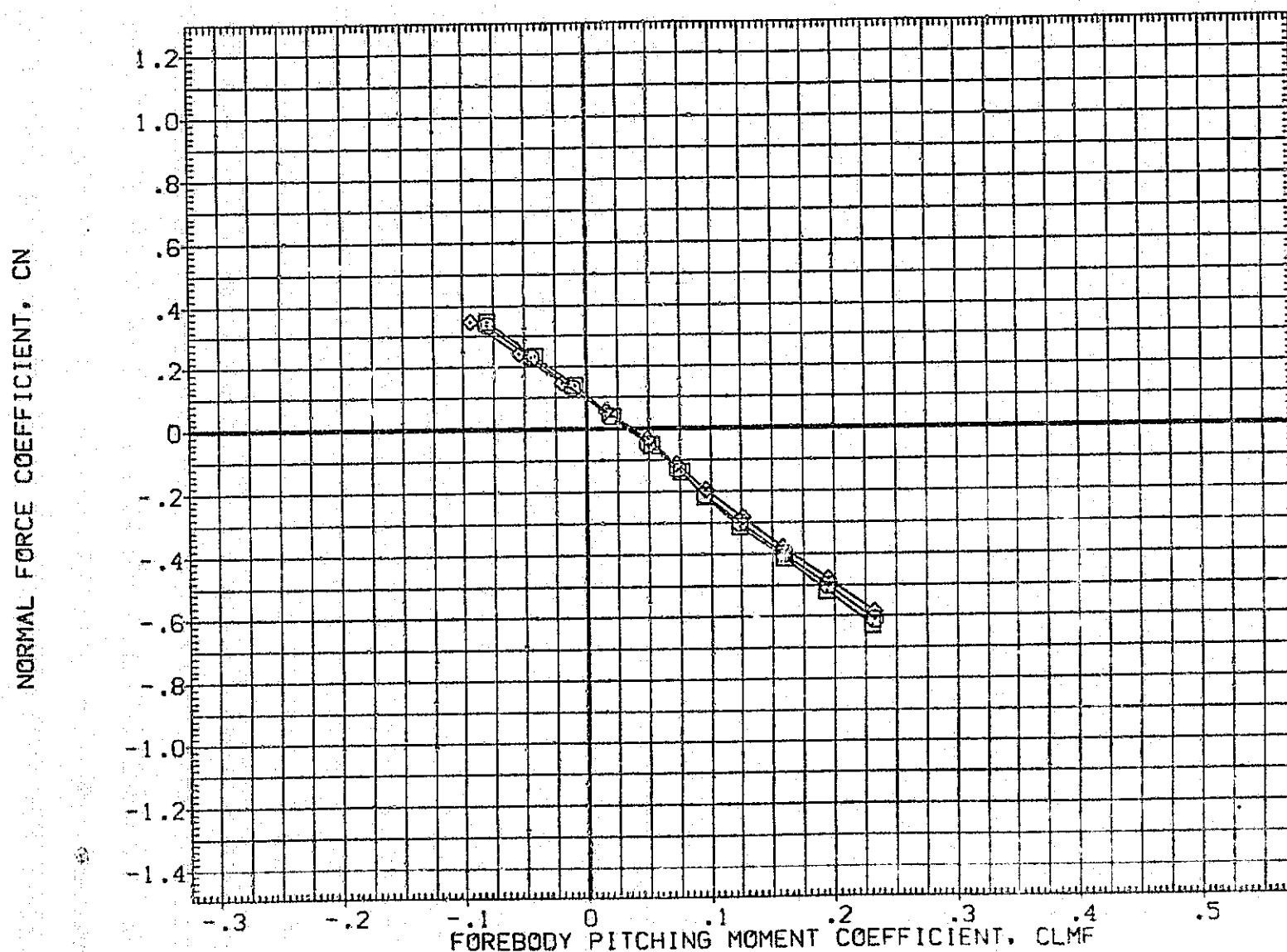


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(H)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
[VIC035]	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
[VIC021]	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
[VIC007]	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

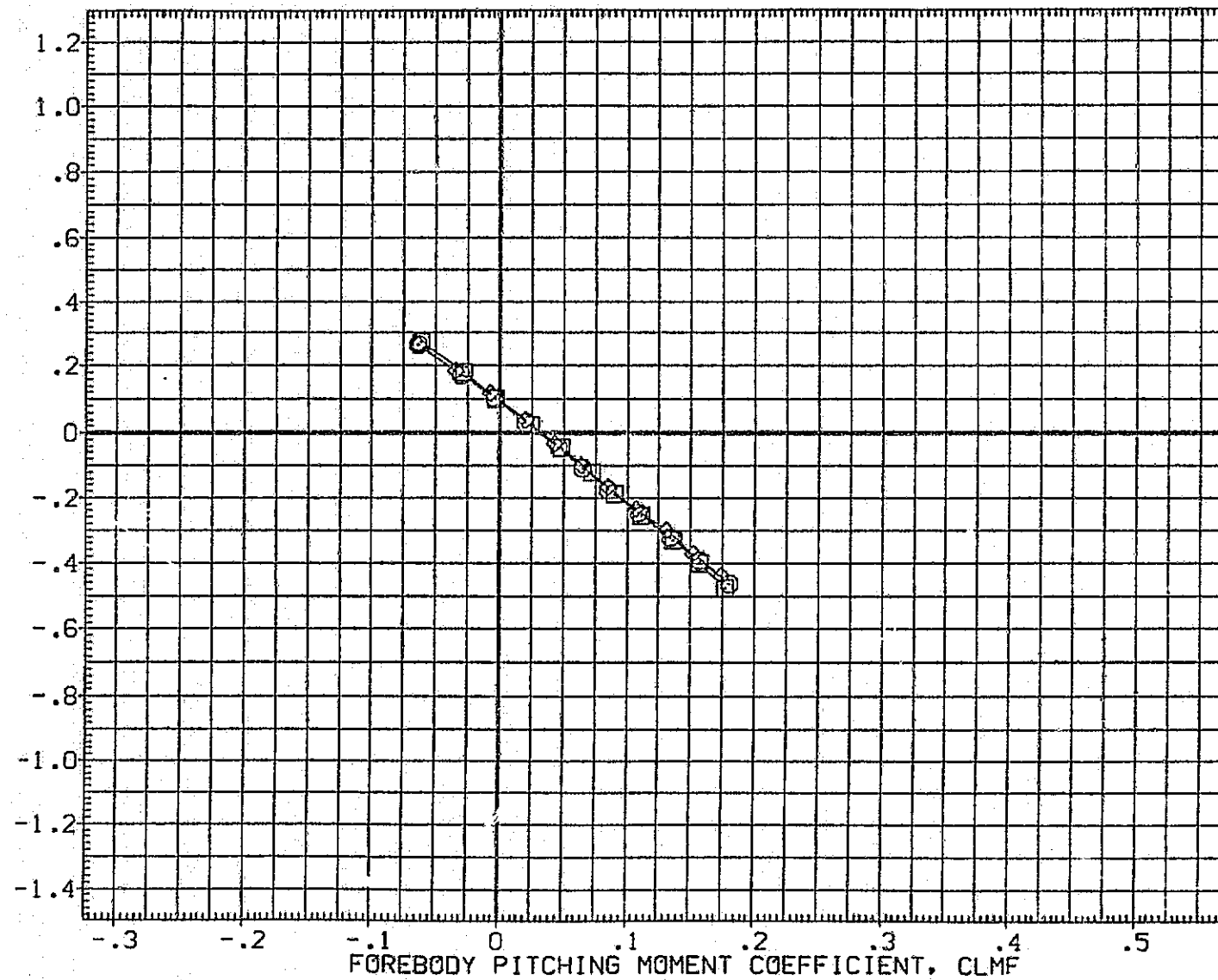


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(1)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740.S (T1P1S1P201)	ORB STING
(AIC035)	DATA NOT AVAILABLE	
(AIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

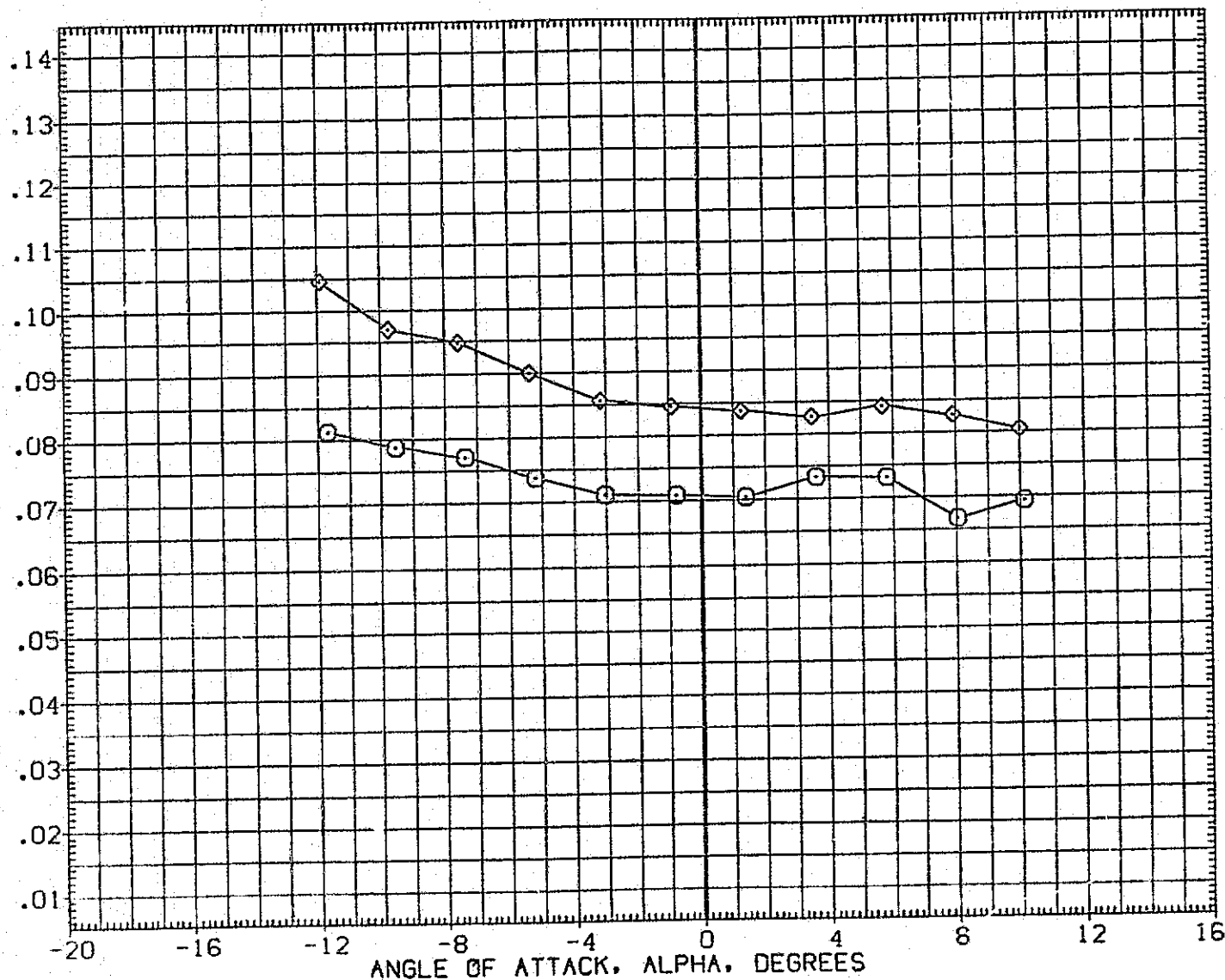


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(A)MACH .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC S94(1A33) 740TS (TIPISIP201)	ORB STING
(AIC035)	DATA NOT AVAILABLE	
(AIC021)	MSFC S94(1A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

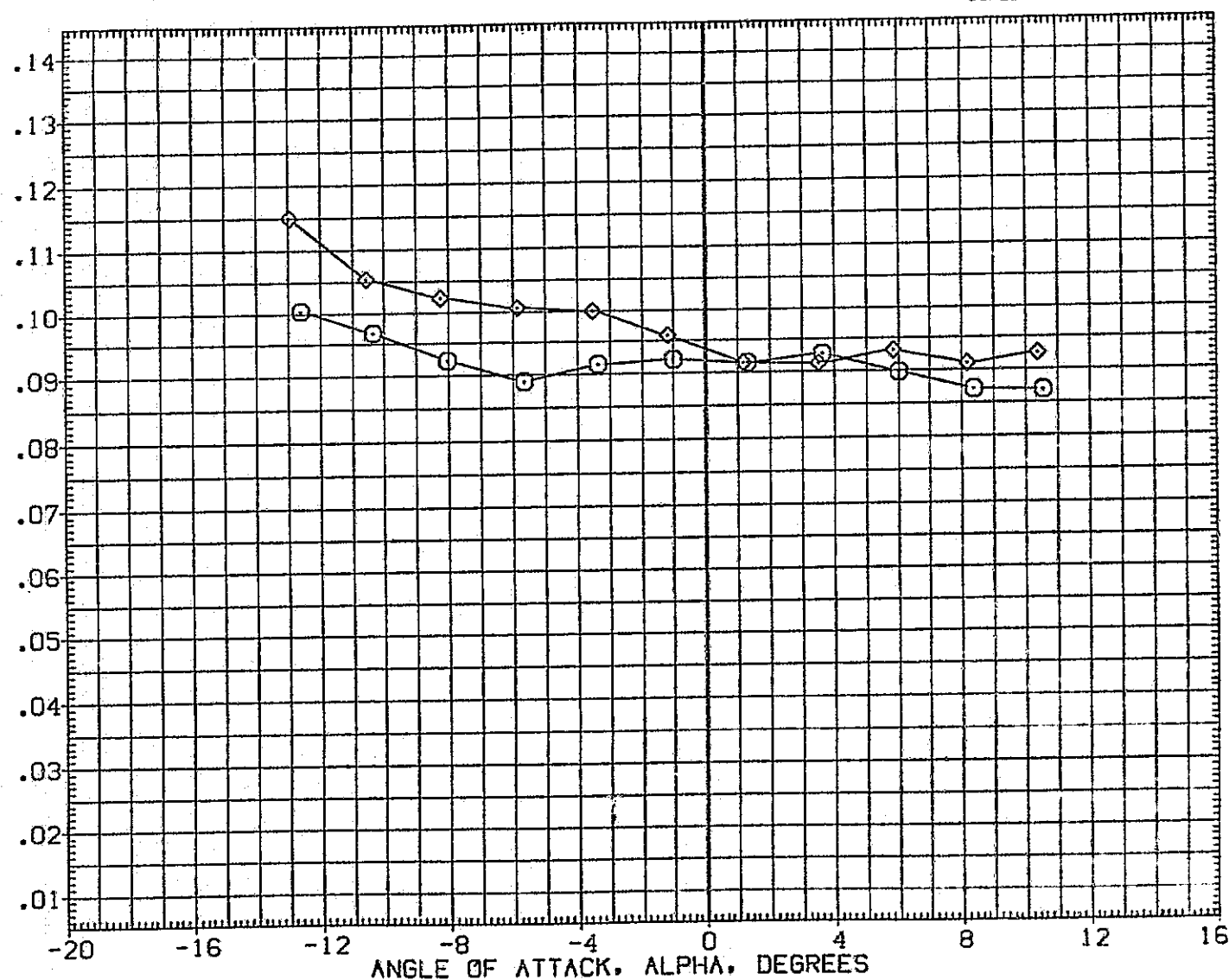


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LONGITUDINAL AERO

(B)MACH

.80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(AIC035)	DATA NOT AVAILABLE	
(AIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

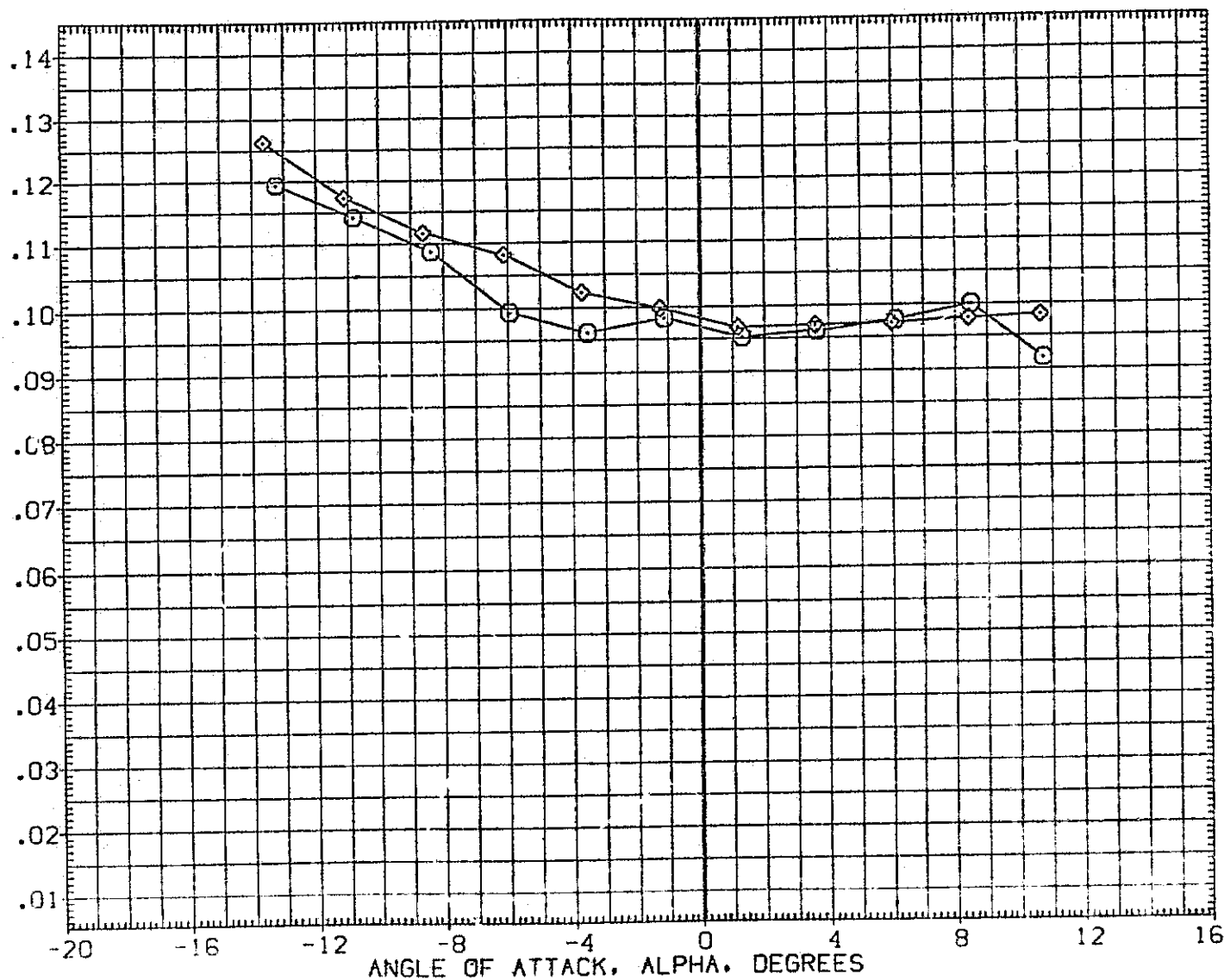


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	DRG STRING
(A1C007)	MSFC S94(1A3J) 740TS (T1P1S1P201)	
(A1C035)	DATA NOT AVAILABLE	
(A1C021)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

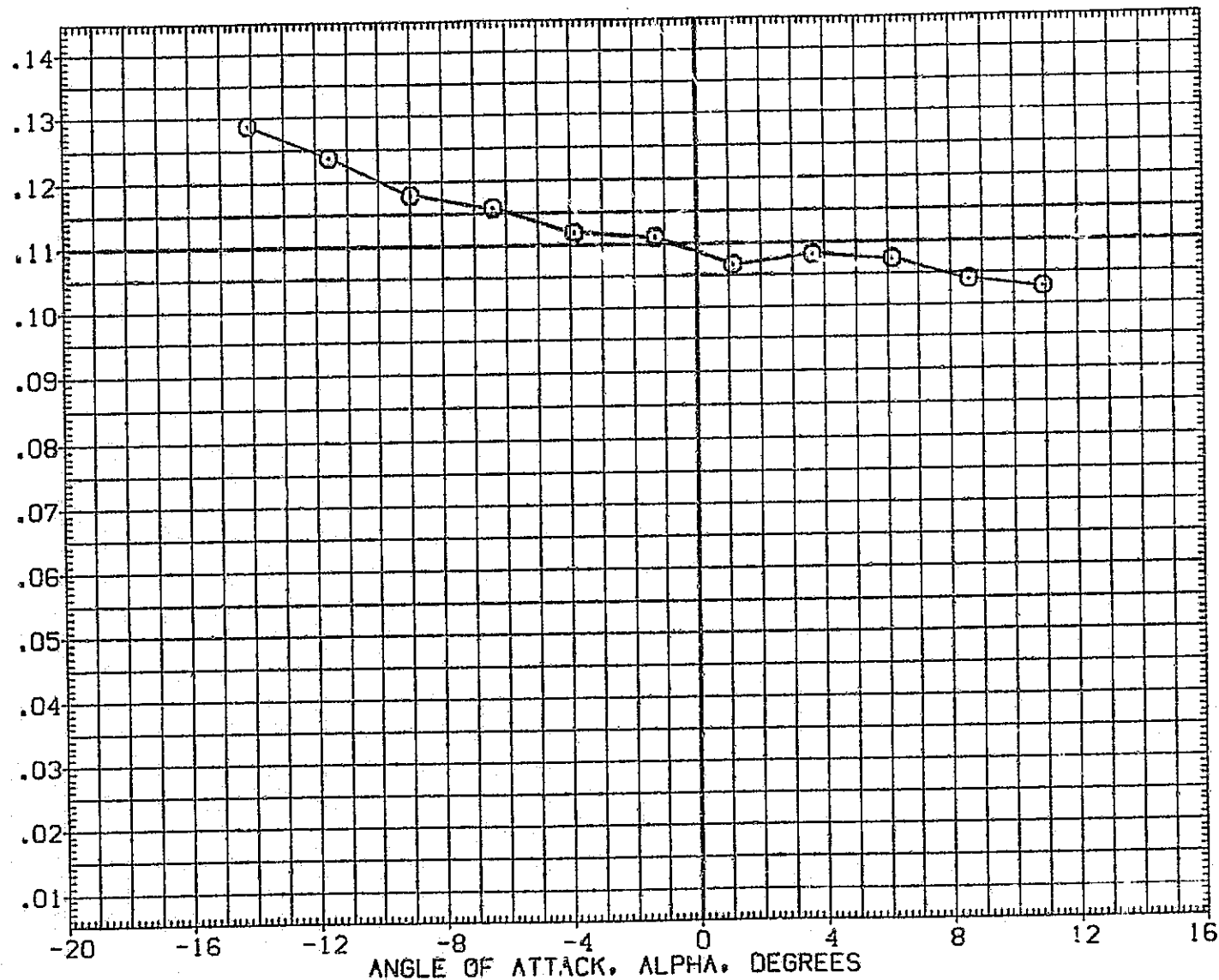


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(D)MACH = 1.05

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING

(AIC007)	MSFC S94(1A33) 740TS (T1P1S1P201)	ORB STING
(AIC035)	DATA NOT AVAILABLE	
(AIC021)	MSFC S94(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

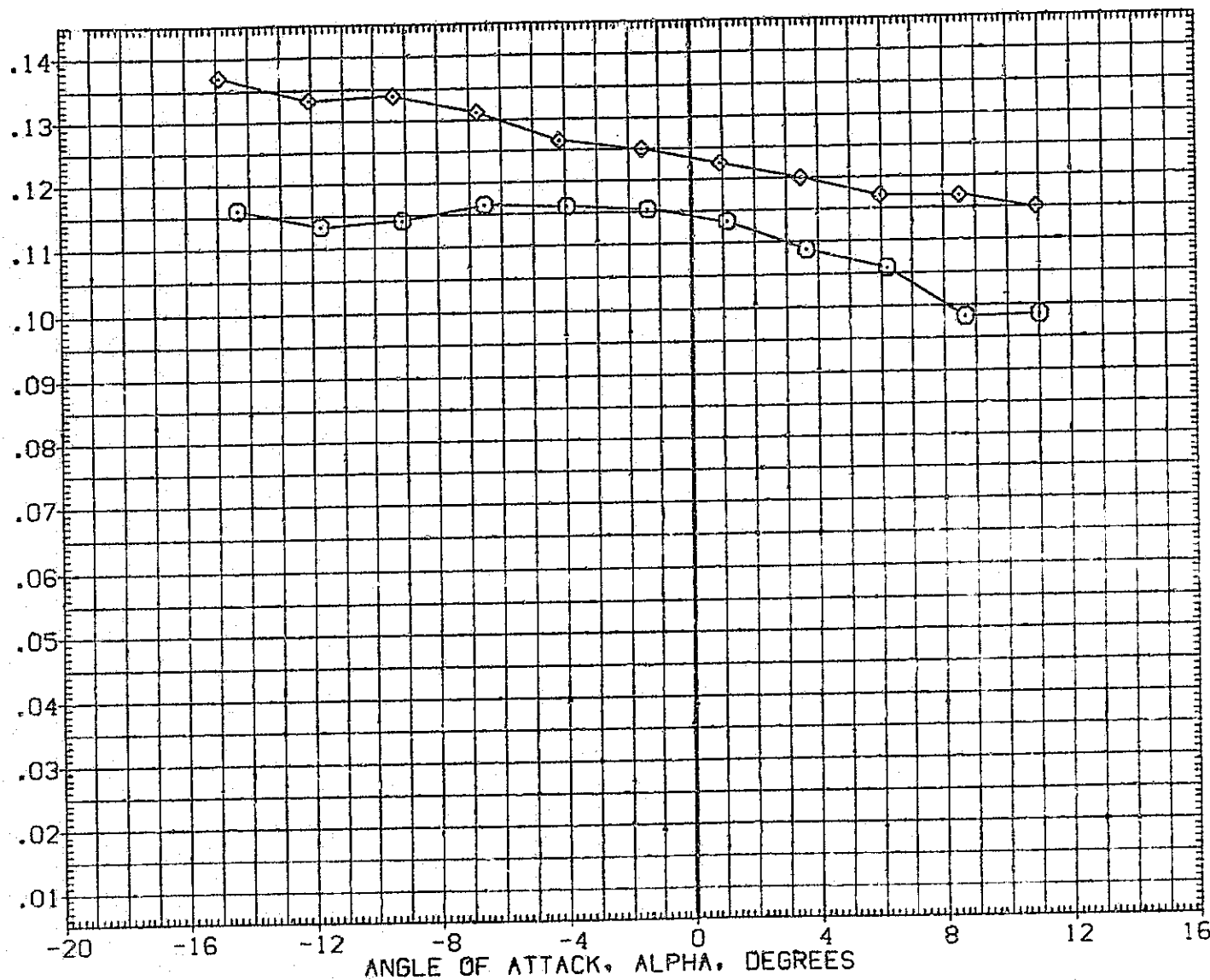


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(AIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(AIC035)	DATA NOT AVAILABLE	
(AIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

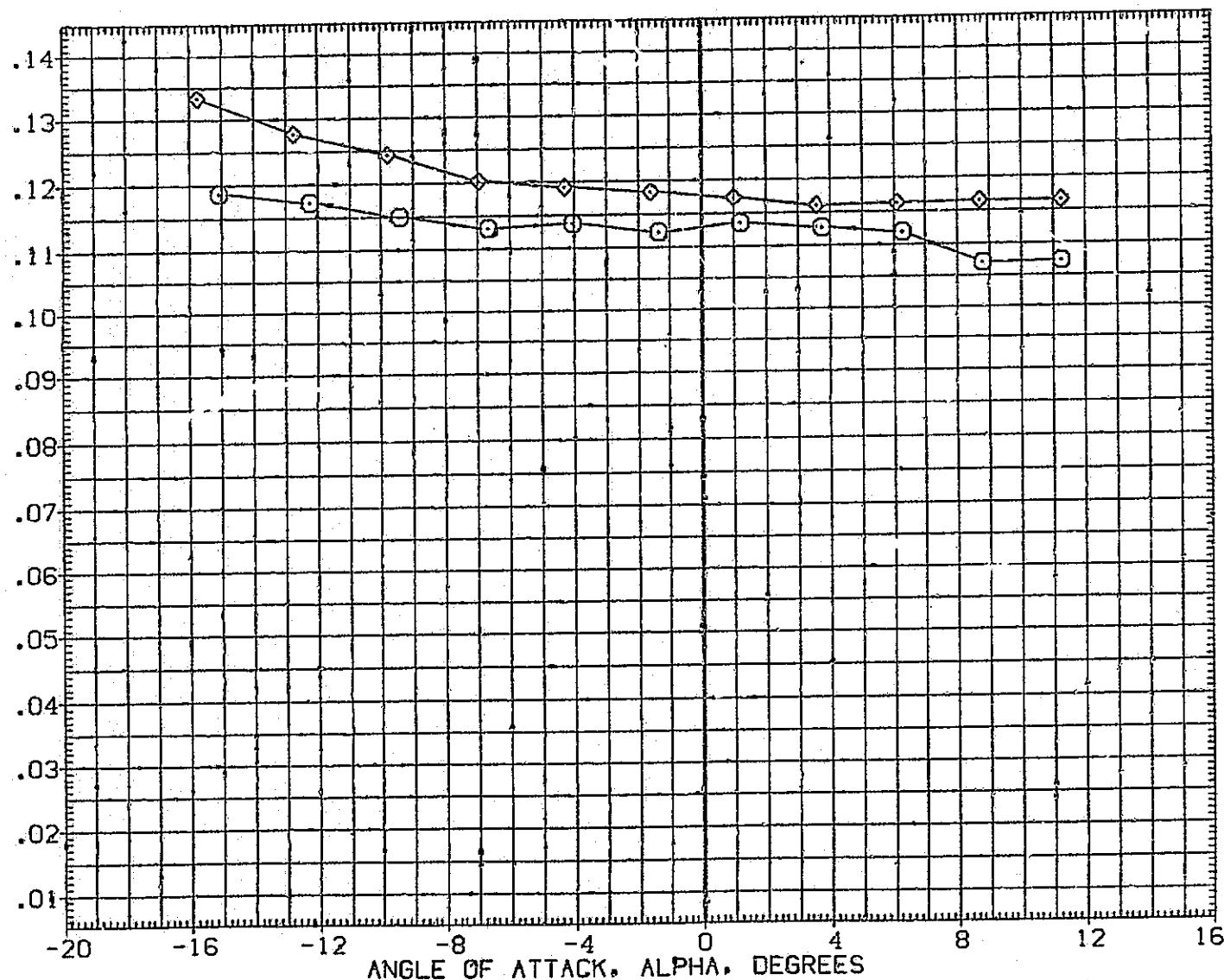


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(F)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 74OTS (T1P1SIP201)	ORB STING
(AIC035)	DATA NOT AVAILABLE	
(AIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

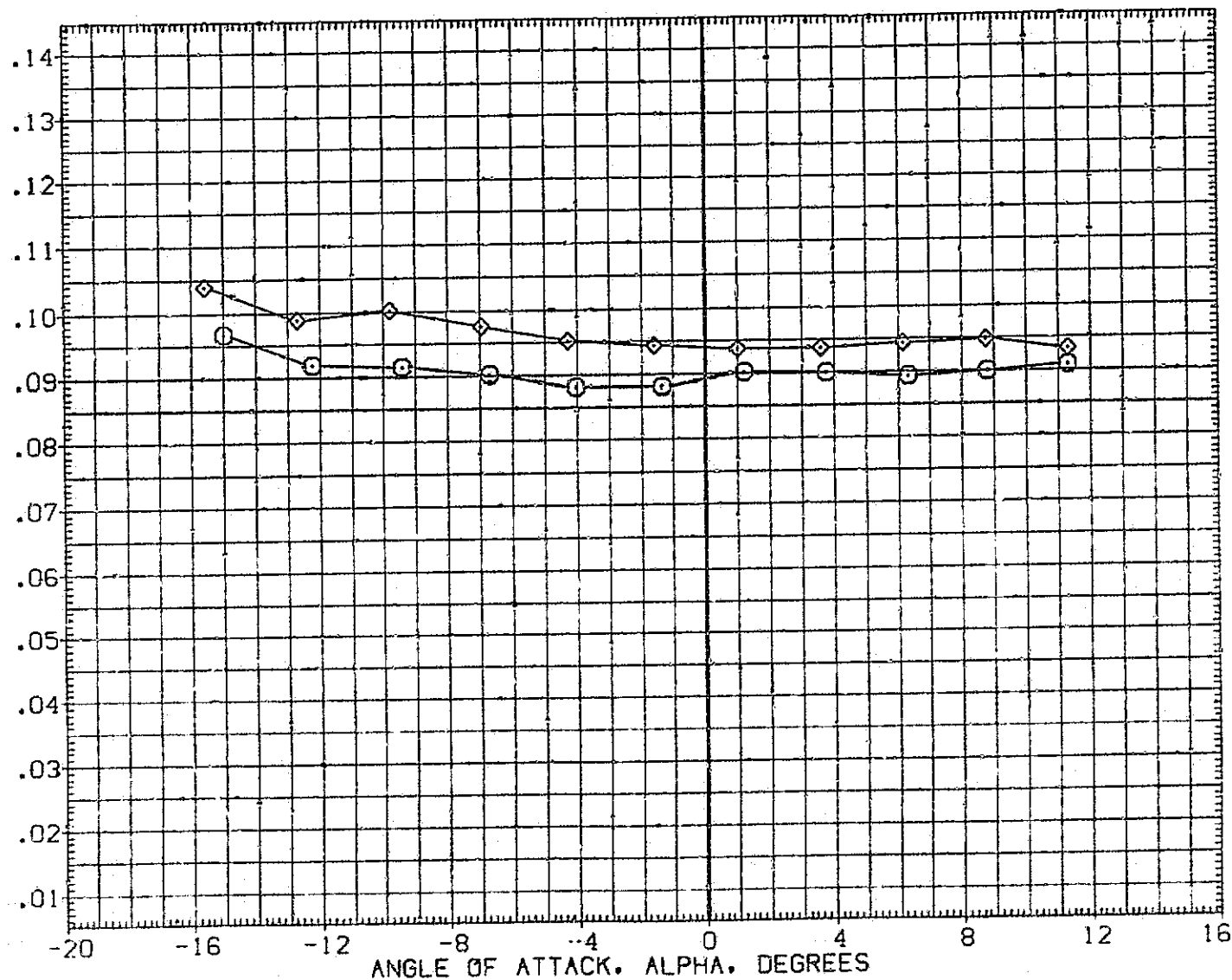


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(G)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(AIC035)	DATA NOT AVAILABLE	
(AIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

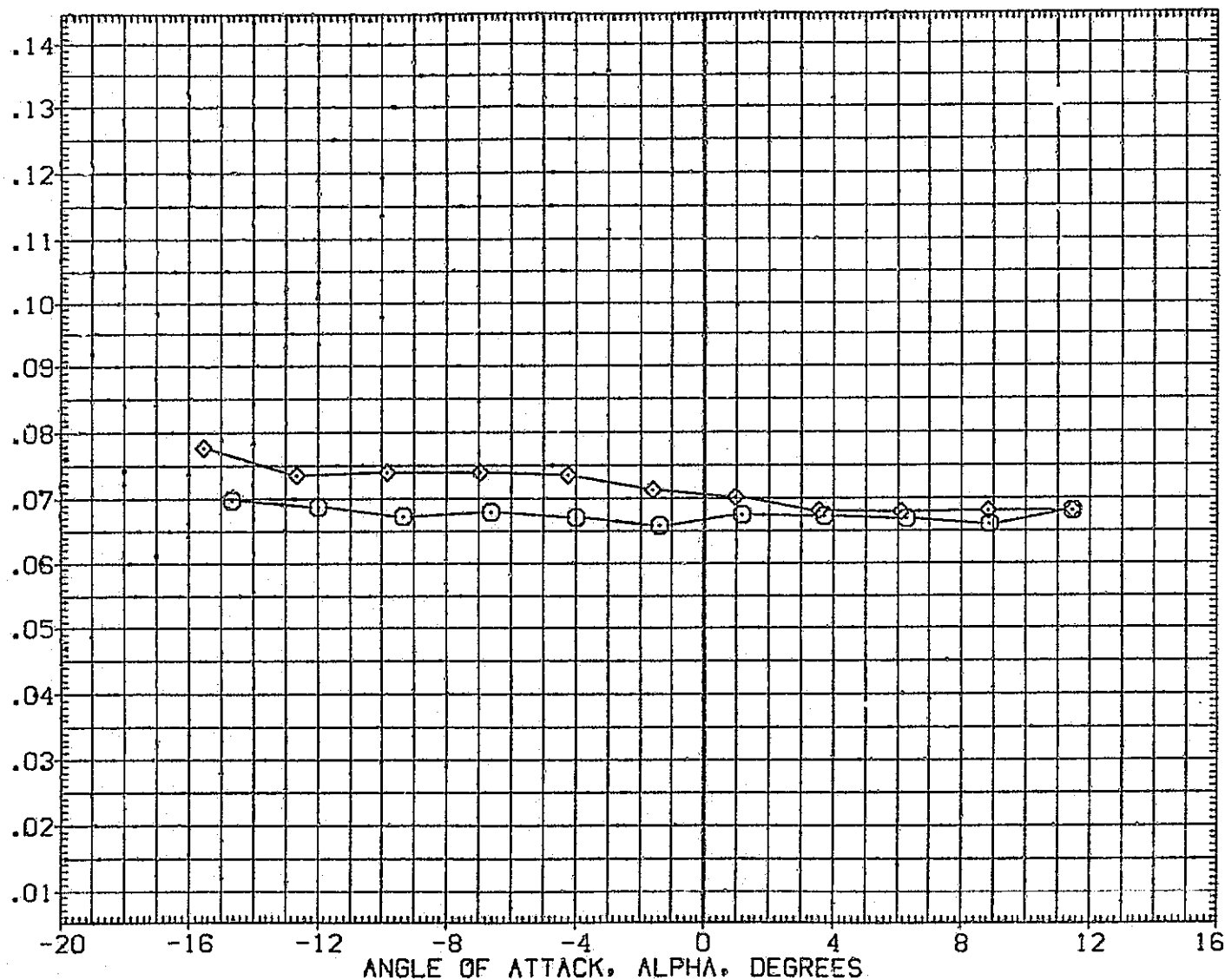


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(H)MACH = 1.97

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DATA SET SYMBOL CONFIGURATION DESCRIPTION

(AIC007)	□	MSFC S94(1A33) 740TS (T1P1S1P201)	ORB STING
(AIC035)	□	MSFC S94(1A33) 740TS (T1P1S3P201F2)	ORB STING
(AIC021)	◇	MSFC S94(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

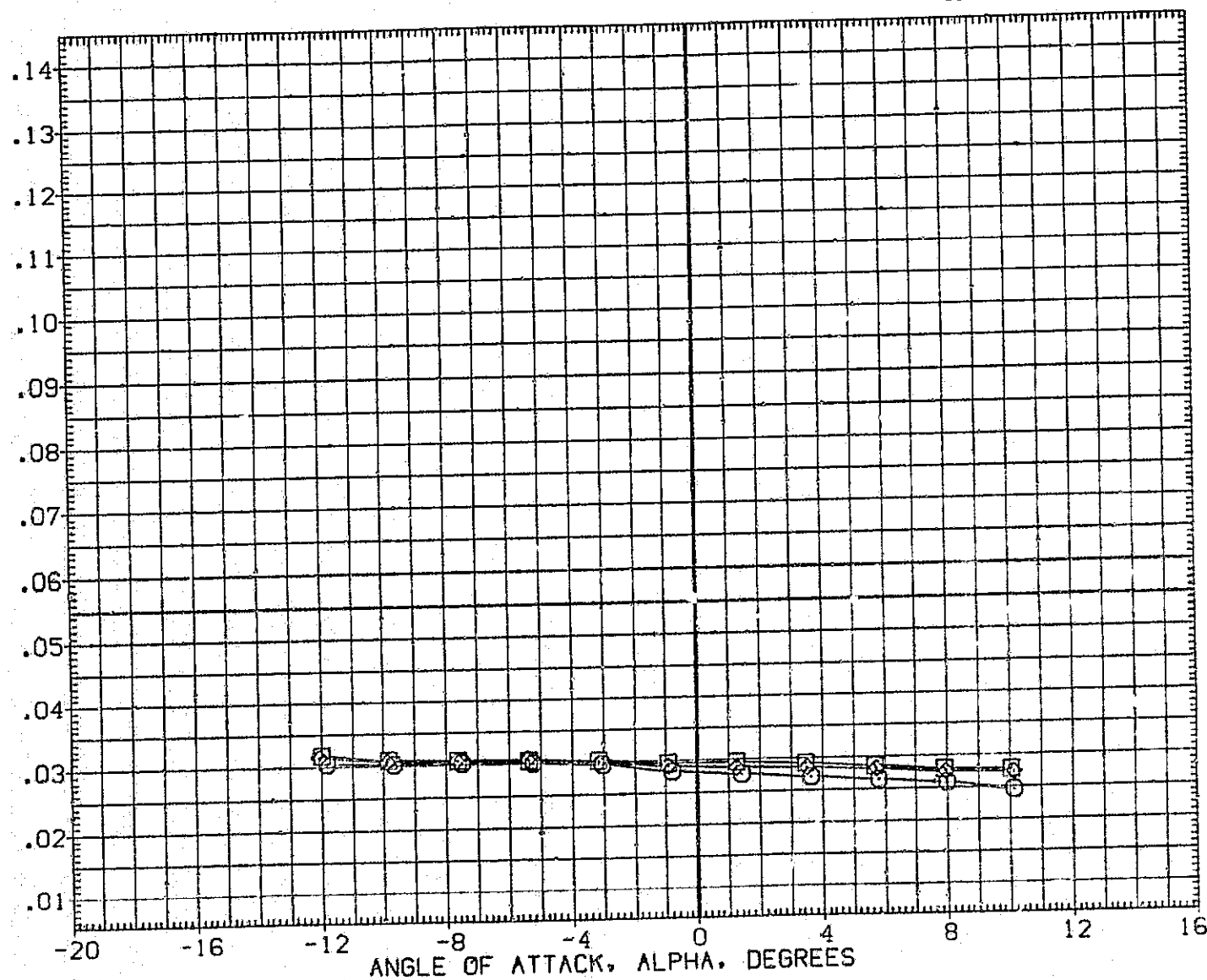


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(1)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(AIC035)	MSFC 594(1A33) 740TC (T1P1S3P201F2)	ORB STING
(AIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

EXTERNAL TANK BASE AXIAL FORCE COEFFICIENT, C_{ABE}

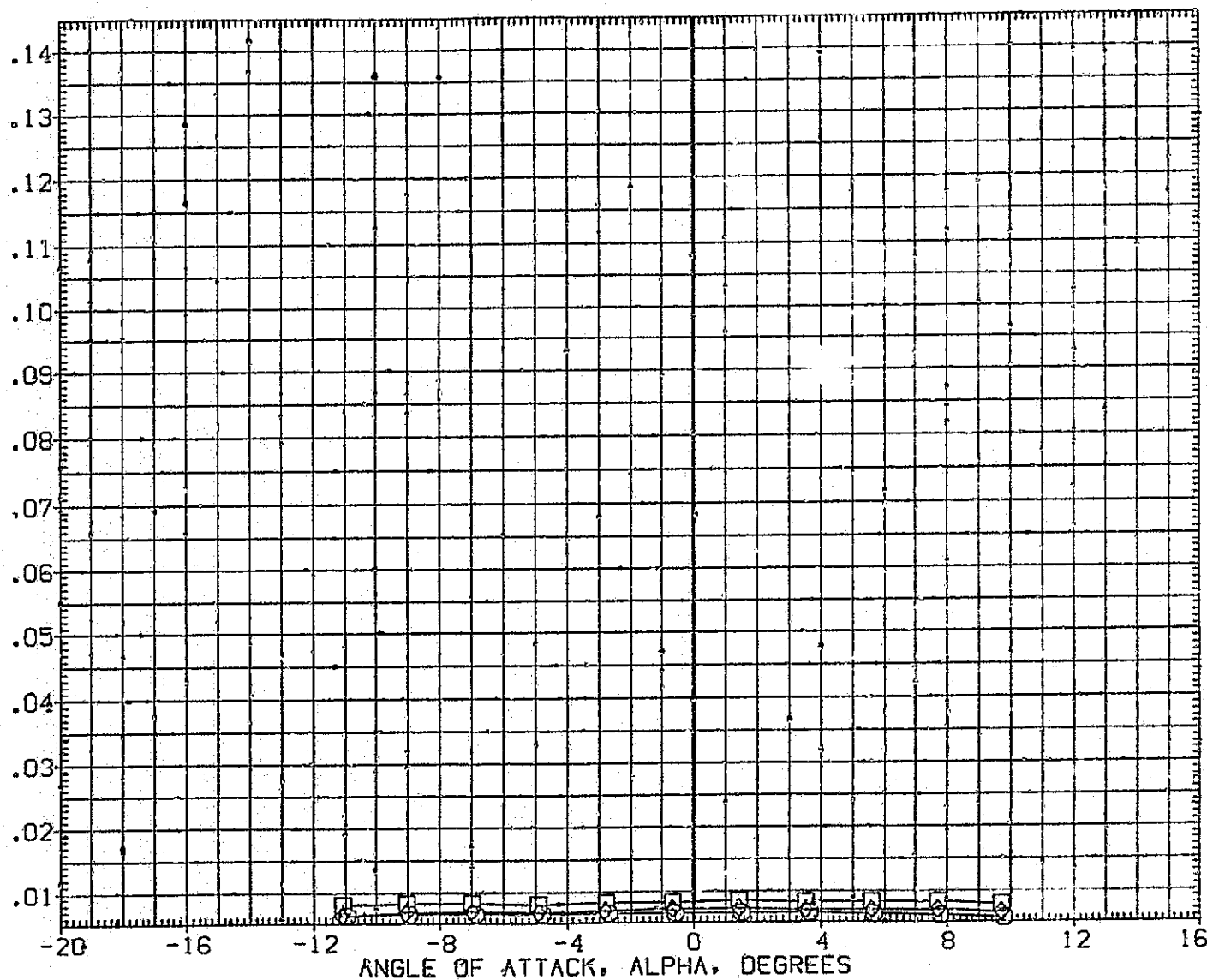


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LONGITUDINAL AERO

(J)MACH = 4.96

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DATA SET SYMBOL CONFIGURATION DESCRIPTION

(A1C007)	○	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(A1C035)	□	DATA NOT AVAILABLE	
(A1C021)	◇	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

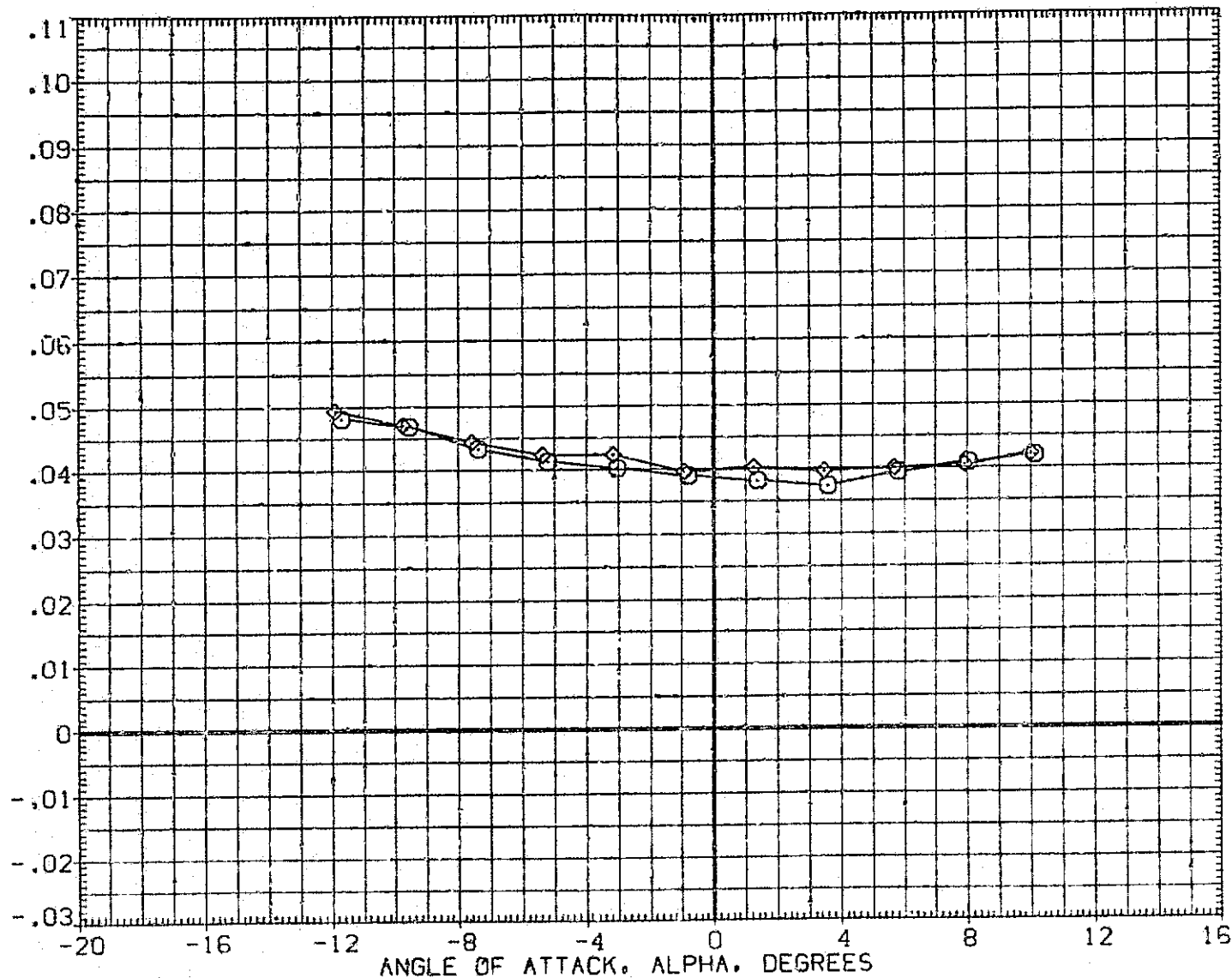


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING
(AIC035)	DATA NOT AVAILABLE	
(AIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

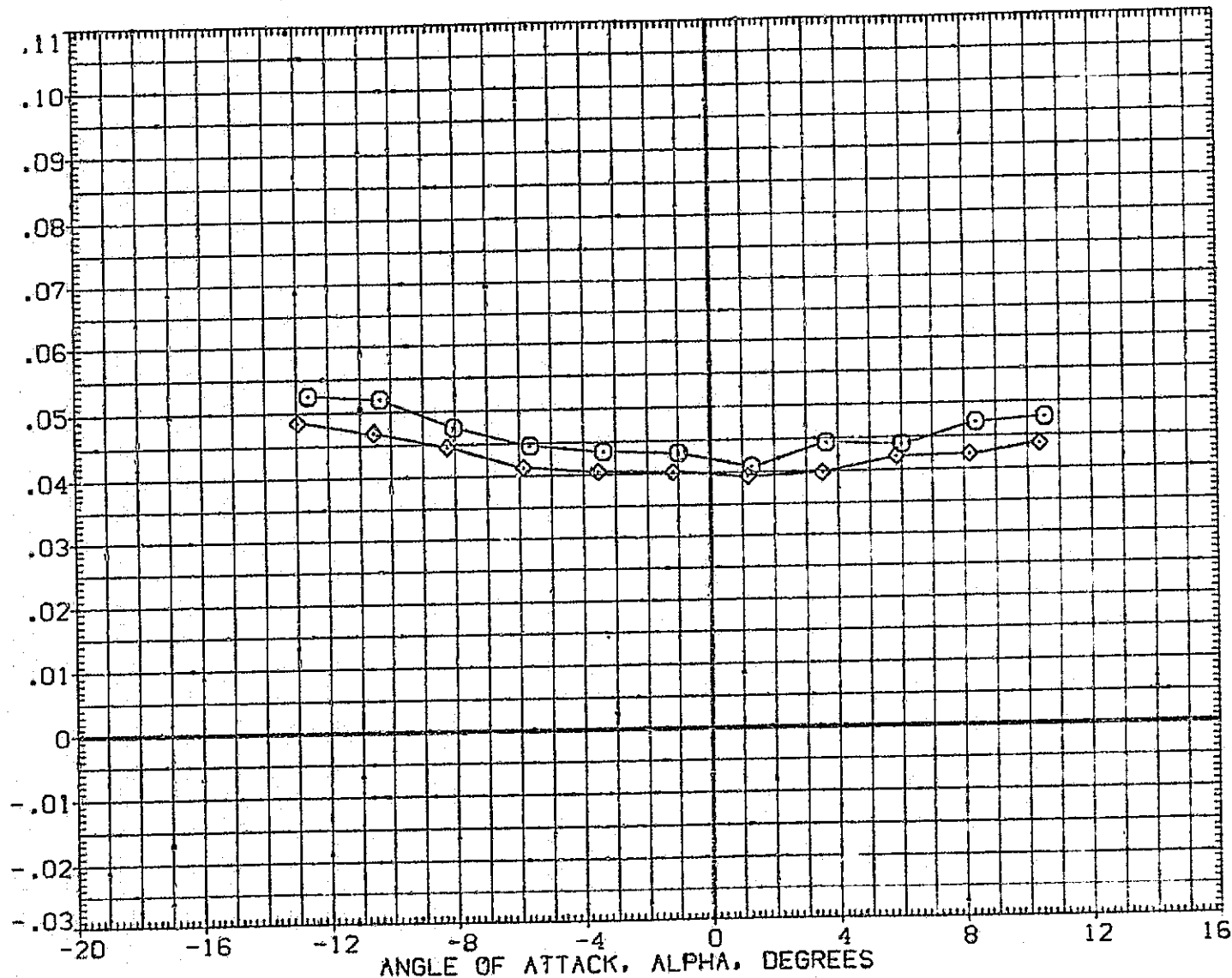


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
{A1C007}	MSFC 594(1A33) 740TS (T1PIS(P201))	ORB STING
{A1C035}	DATA NOT AVAILABLE	
{A1C021}	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

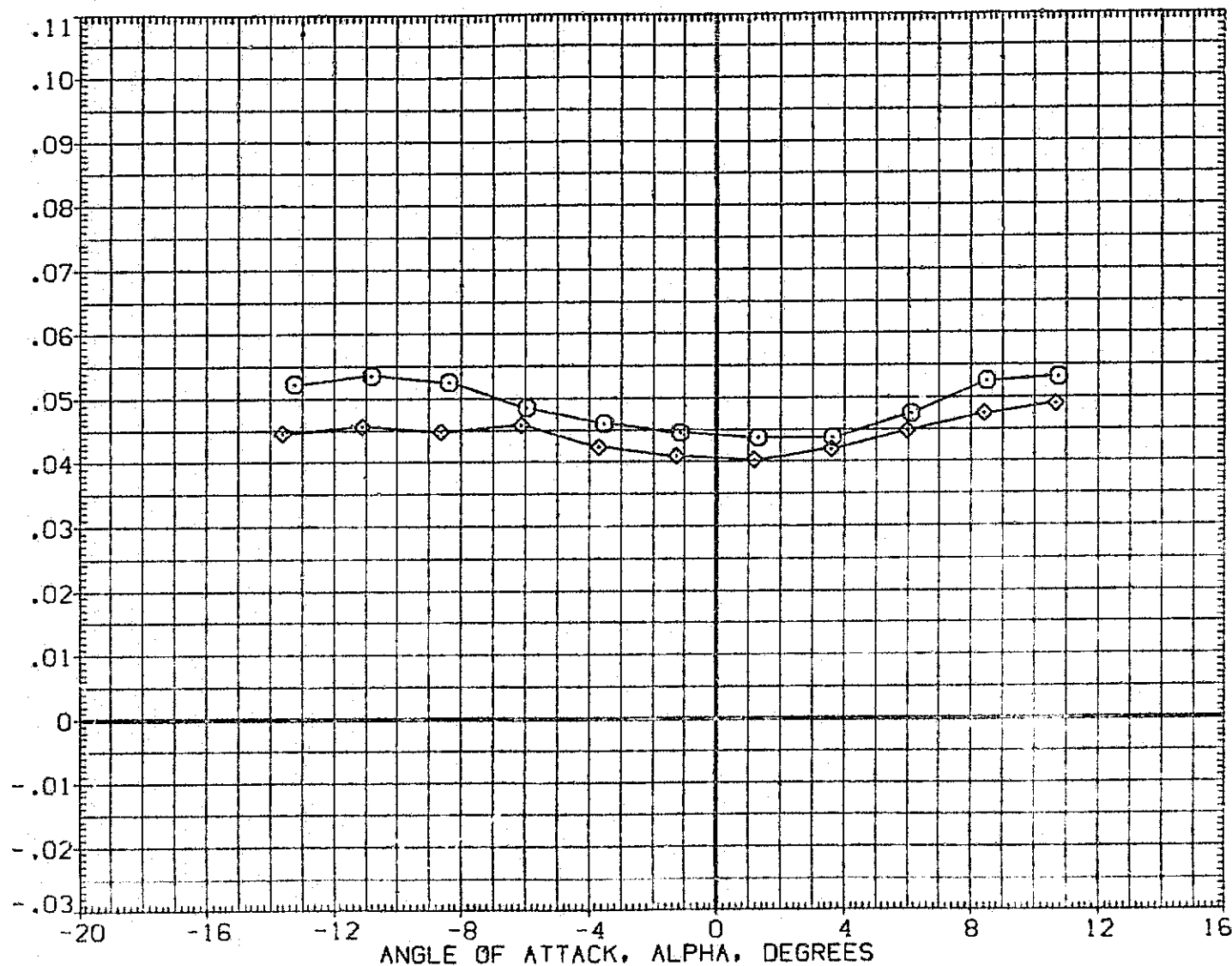


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(C)MACH = .91

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(A33) 740TS (TIPISIP201)	
(AIC035)	DATA NOT AVAILABLE	
(AIC021)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

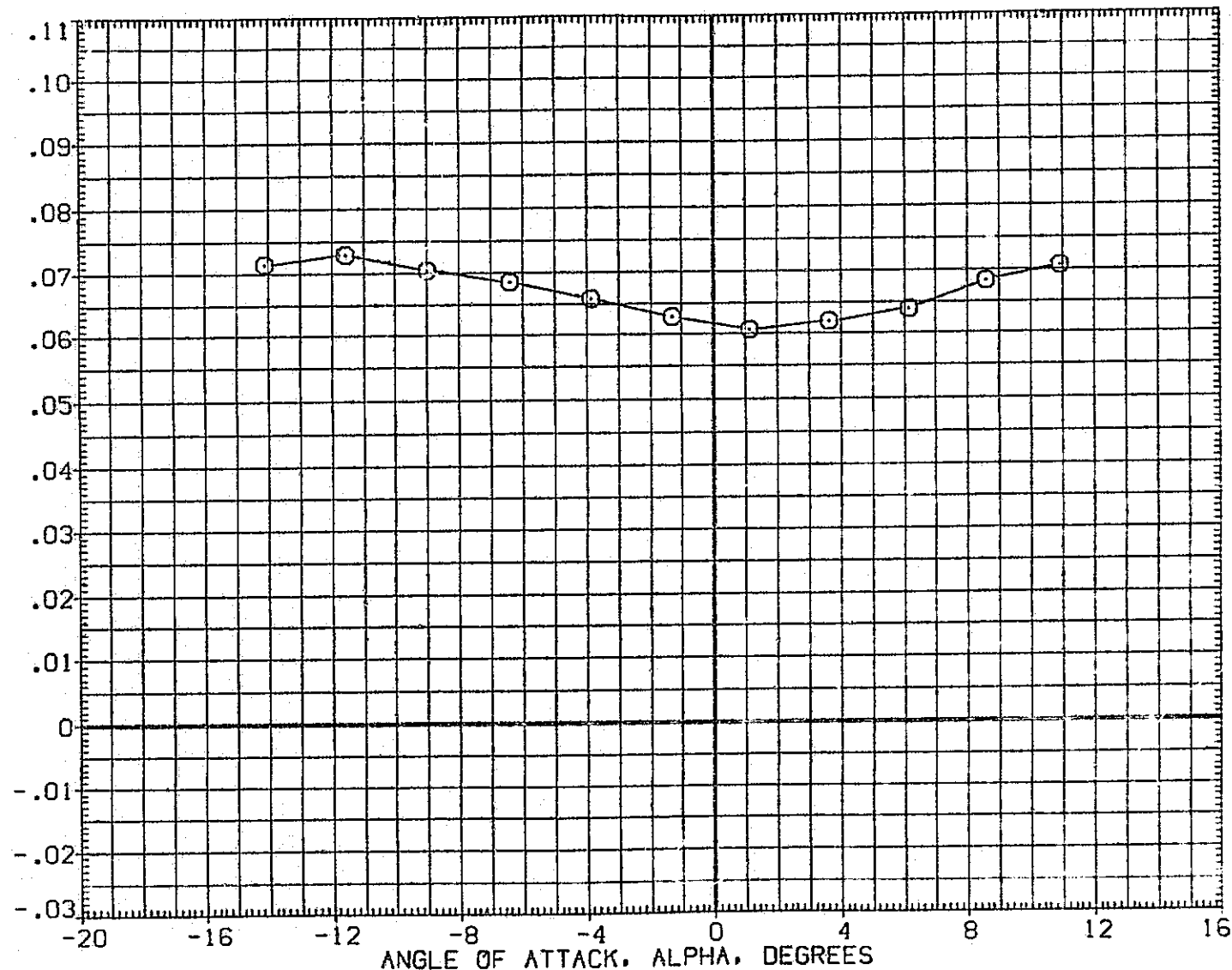


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(AIC035)	DATA NOT AVAILABLE	
(AIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

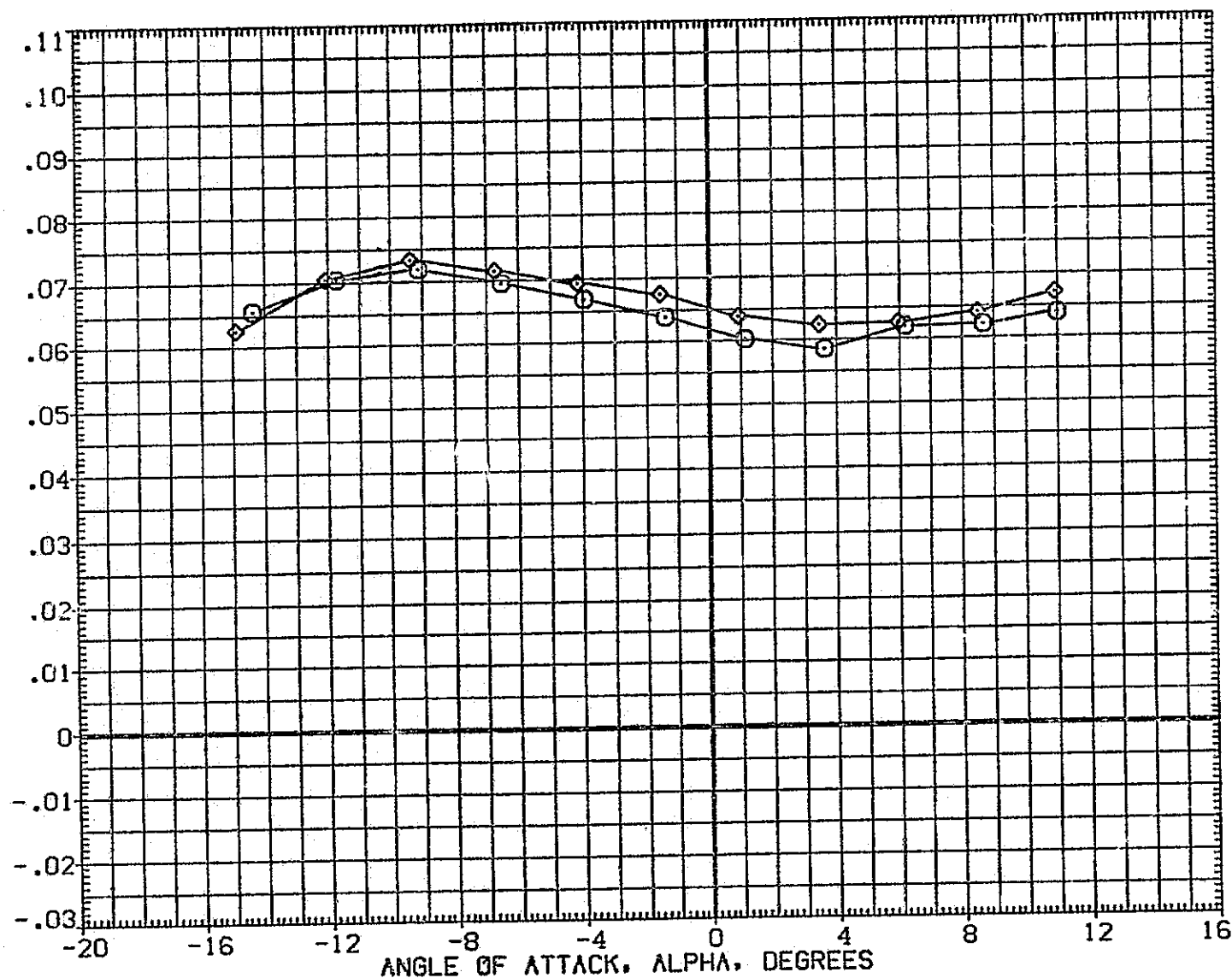


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
[A1C007]	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
[A1C035]	DATA NOT AVAILABLE	
[A1C021]	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

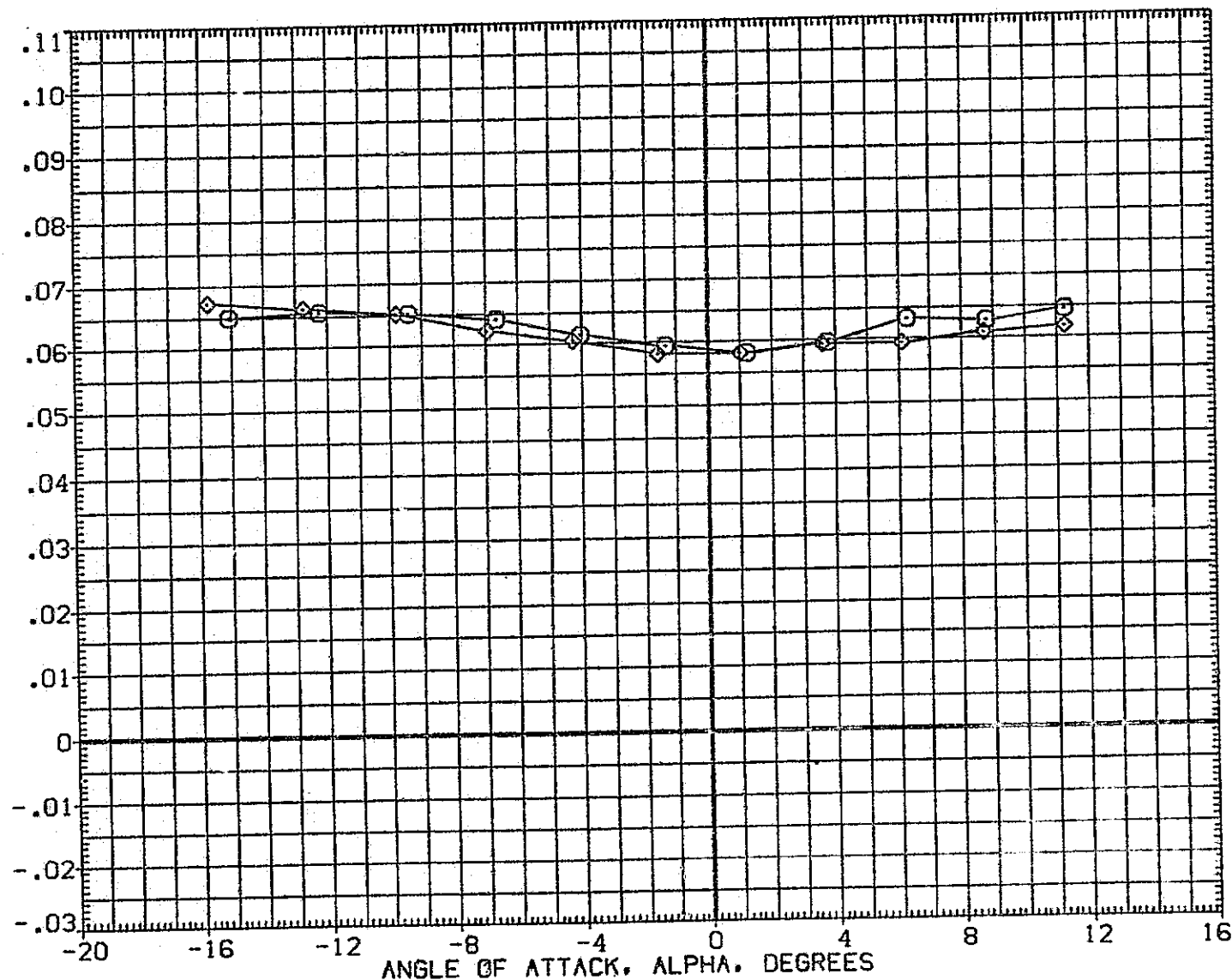


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(F)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(A1C007)	MSFC S94(IA33) 740TS (T1P1S1P201)	ORB STING
(A1C035)	DATA NOT AVAILABLE	
(A1C021)	MSFC S94(IA33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

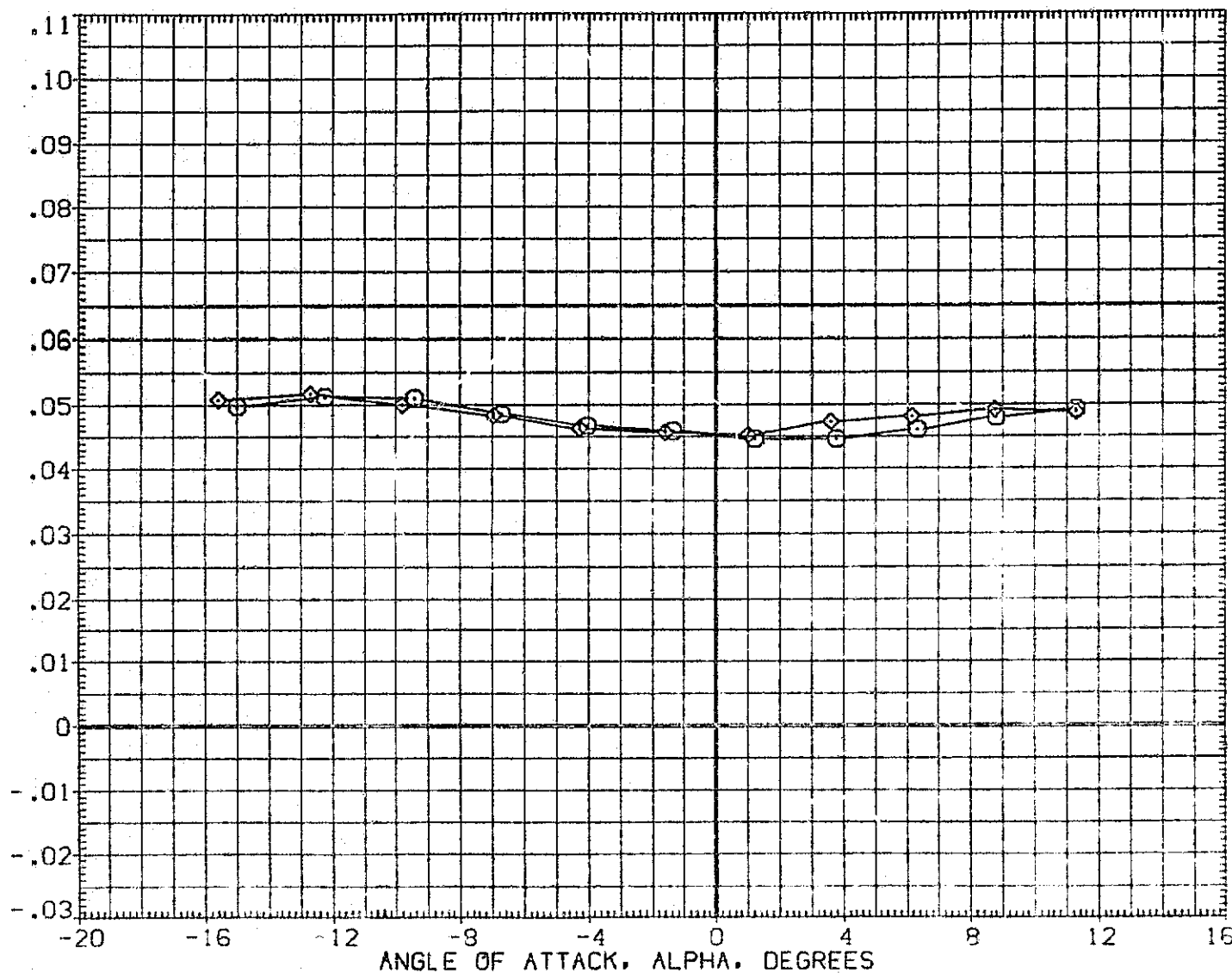


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(G)MACH = 1.46

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(AIC035)	DATA NOT AVAILABLE	
(AIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

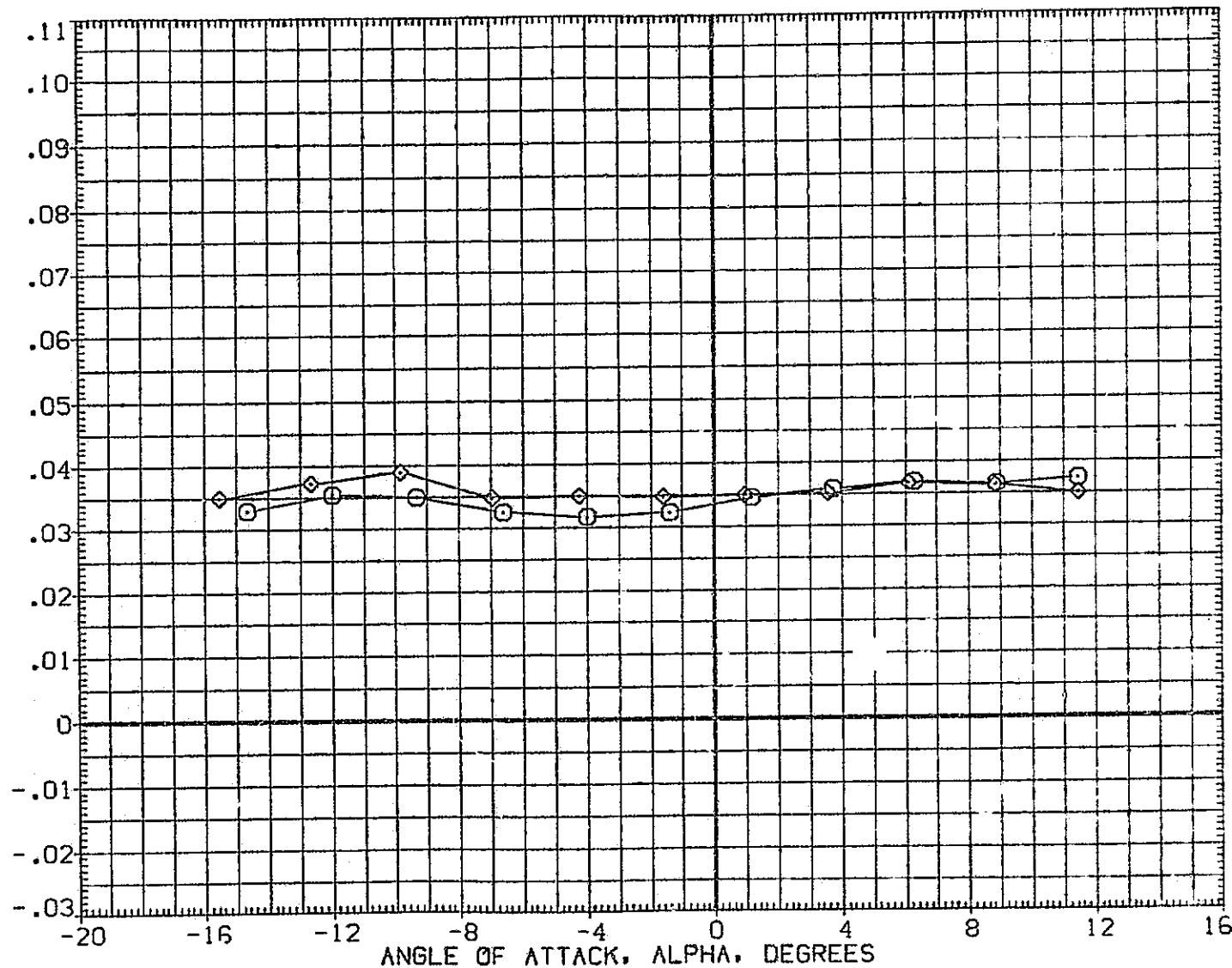


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LONGITUDINAL AERO
(H)MACH = 1.97

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (T1PISIP201)	ORB STING
(AIC035)	MSFC 594(1A33) 740TS (T1PIS3P201F2)	ORB STING
(AIC021)	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

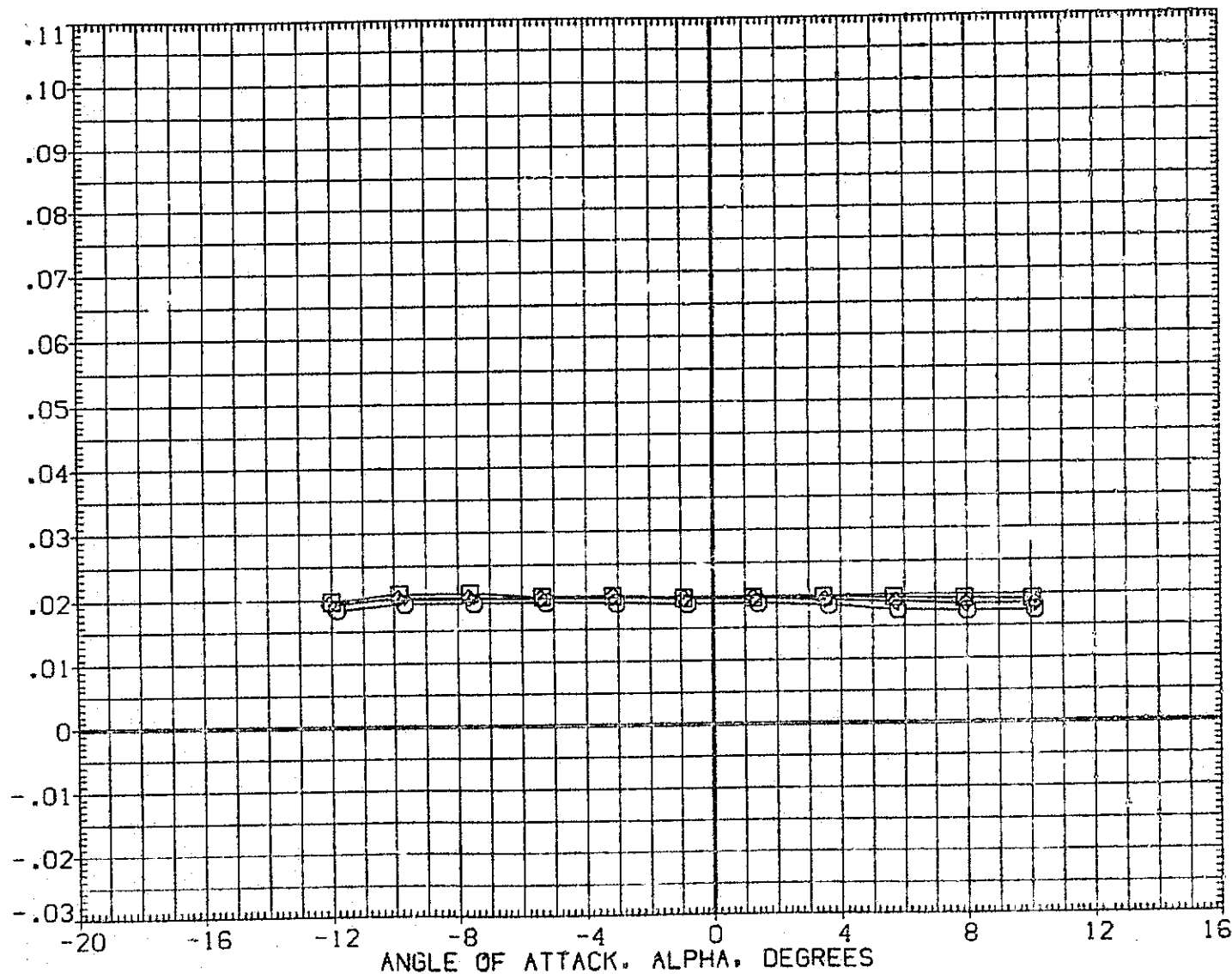


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(1)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(A1C007)	MSFC S94(1A33) 740TS (T1P1S1P201)	ORB STING
(A1C035)	MSFC S94(1A33) 740TS (T1P1S3P201F2)	ORB STING
(A1C021)	MSFC S94(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0E10	

SRB BASE AXIAL FORCE COEFFICIENT, CABS

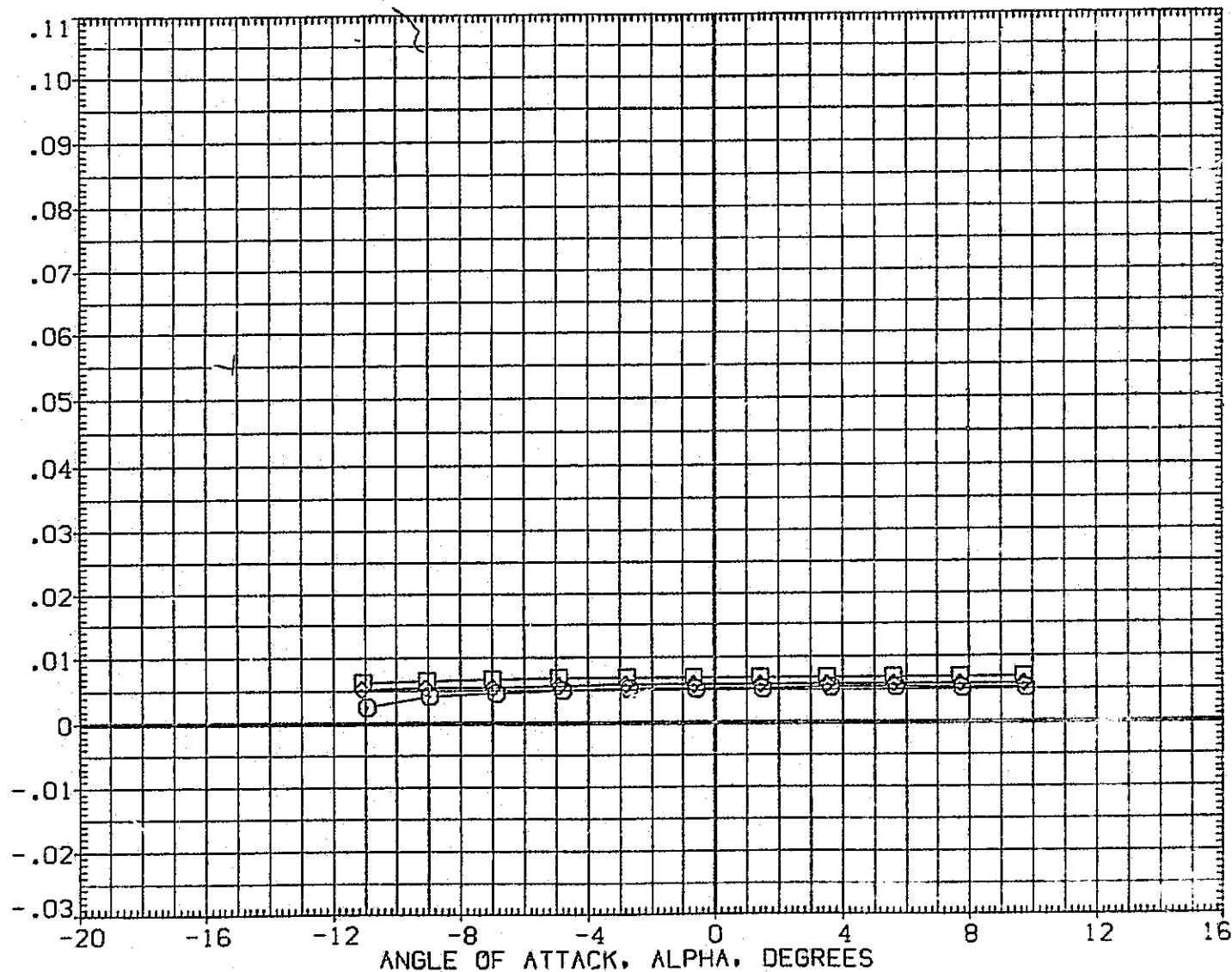


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(J)MACH = 4.96

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(AIC035)	DATA NOT AVAILABLE	
(AIC021)	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. YT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

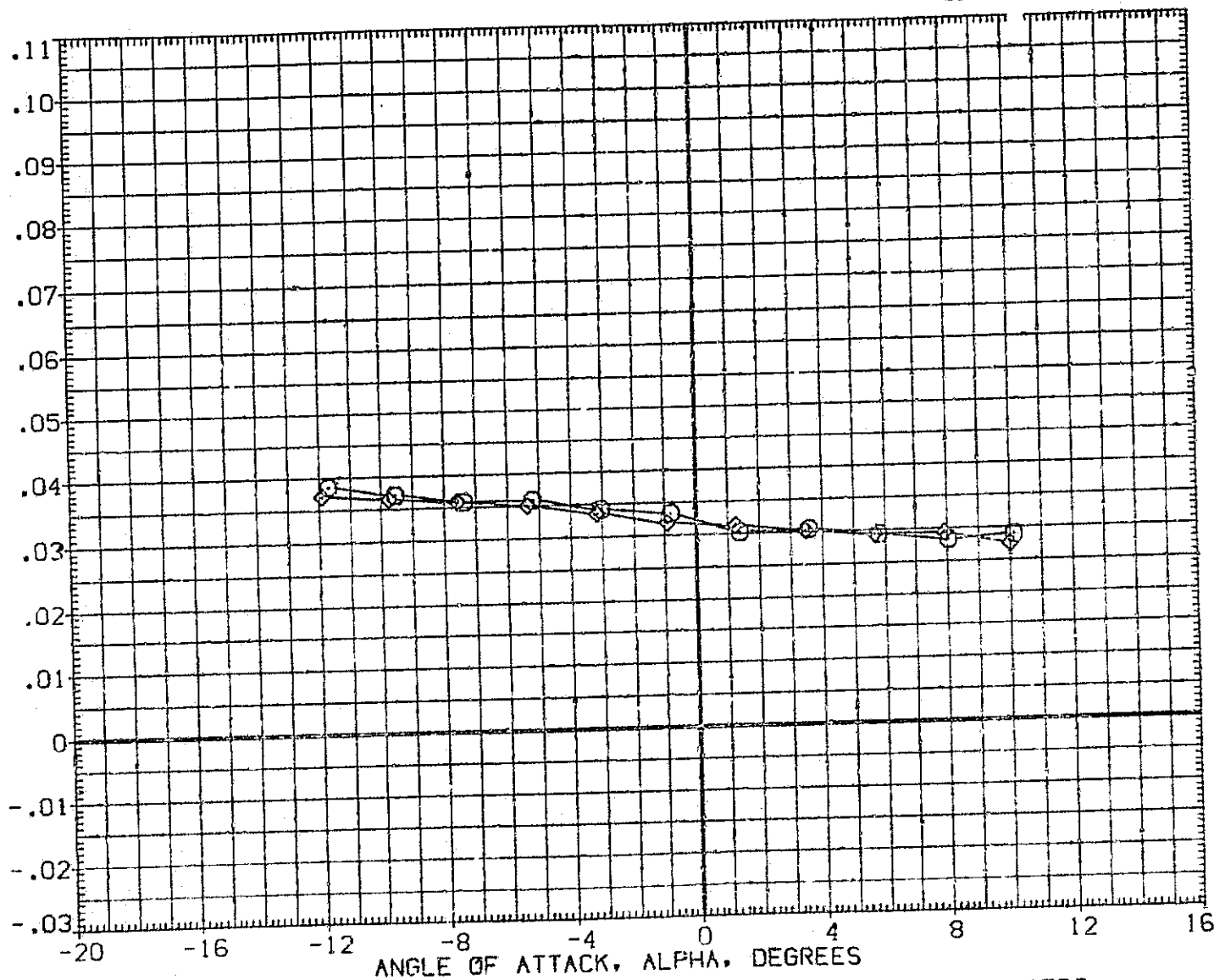


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (T1PIS1P201)	ORB STING
(AIC035)	DATA NOT AVAILABLE	
(AIC021)	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{ABO}

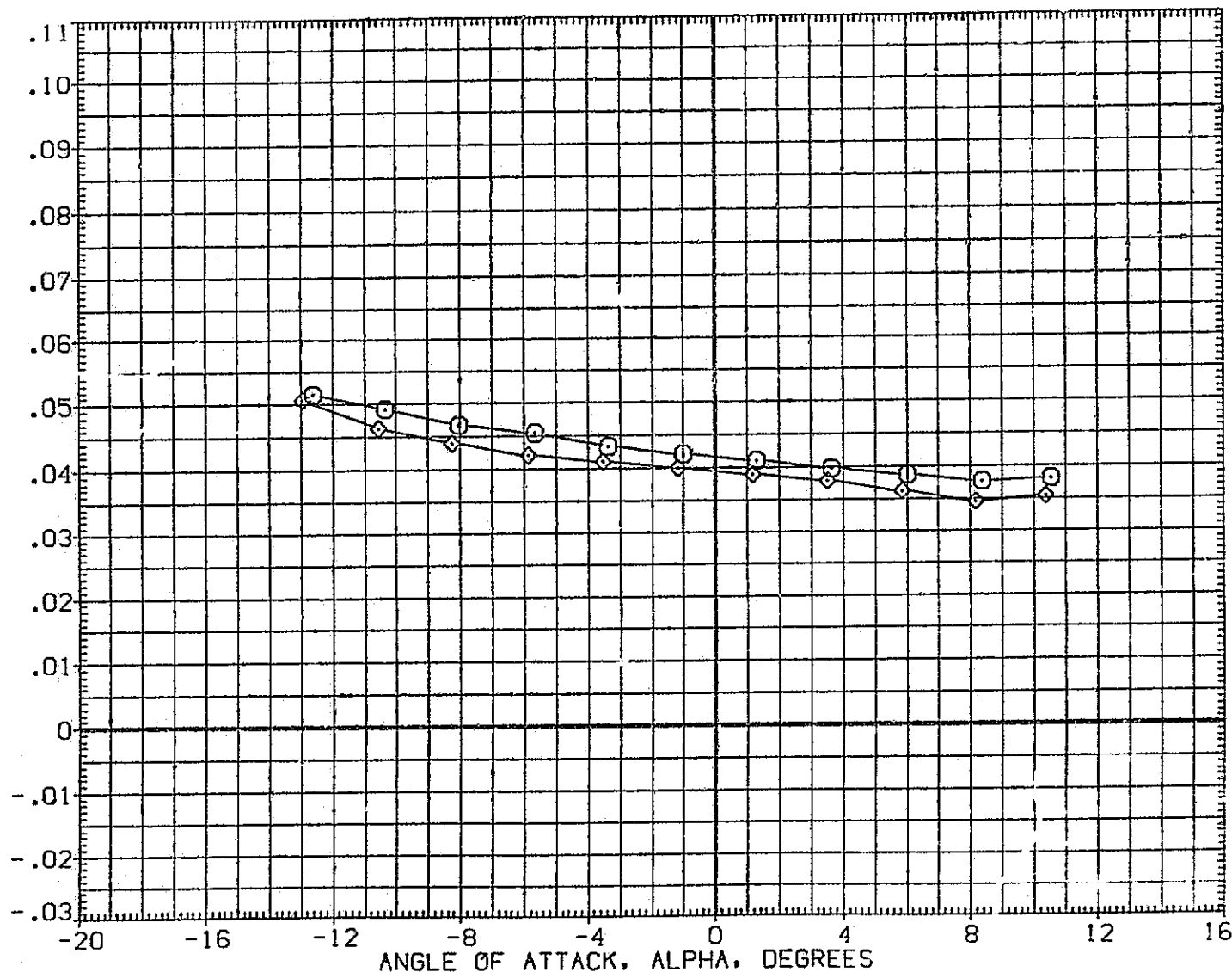


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(AIC035)	DATA NOT AVAILABLE	
(AIC021)	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

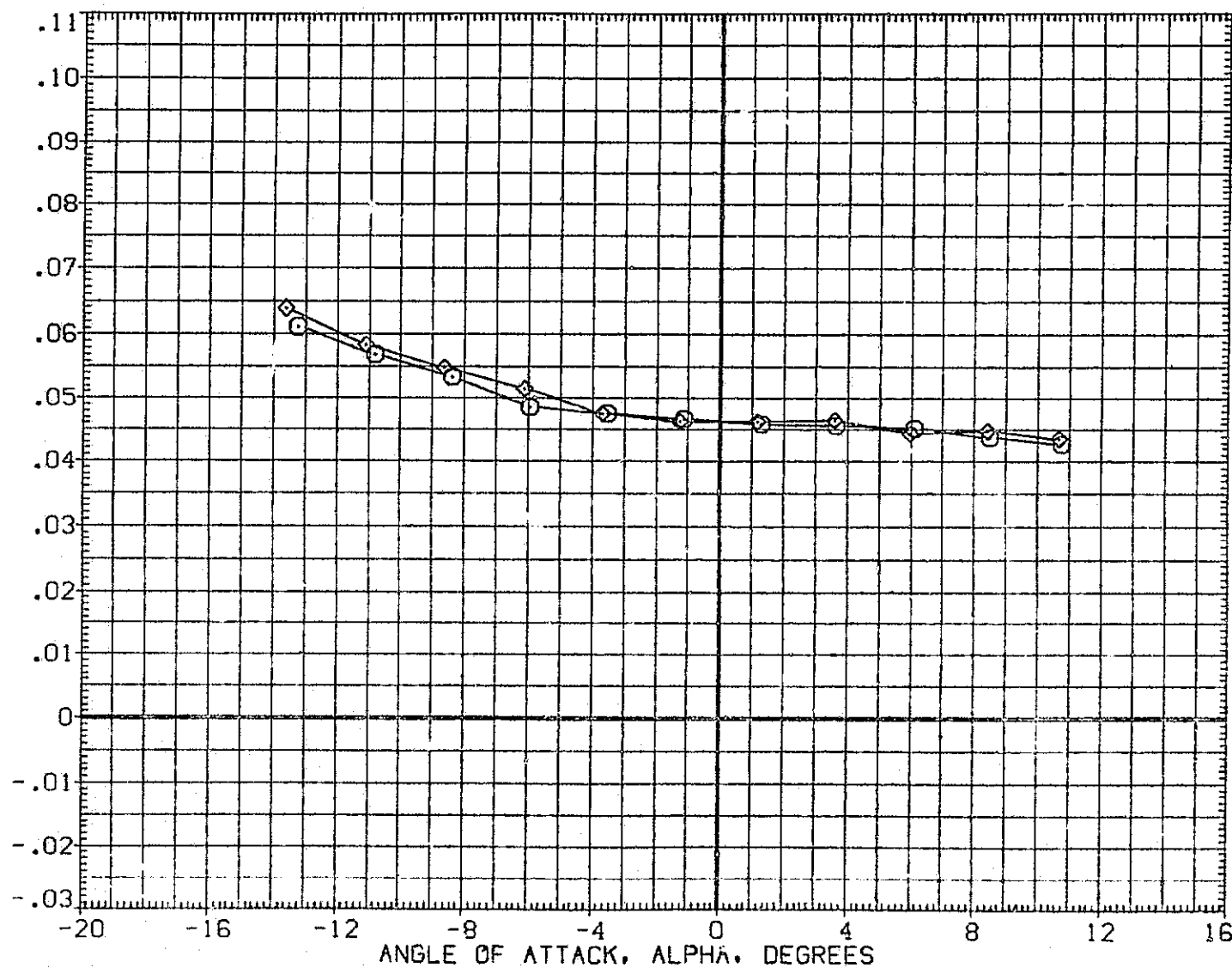


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(C)MACH = .91

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
[AIC007]	MSFC 594(A33) 740TS (TIPISIP201)	
[AIC035]	DATA NOT AVAILABLE	
[AIC021]	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

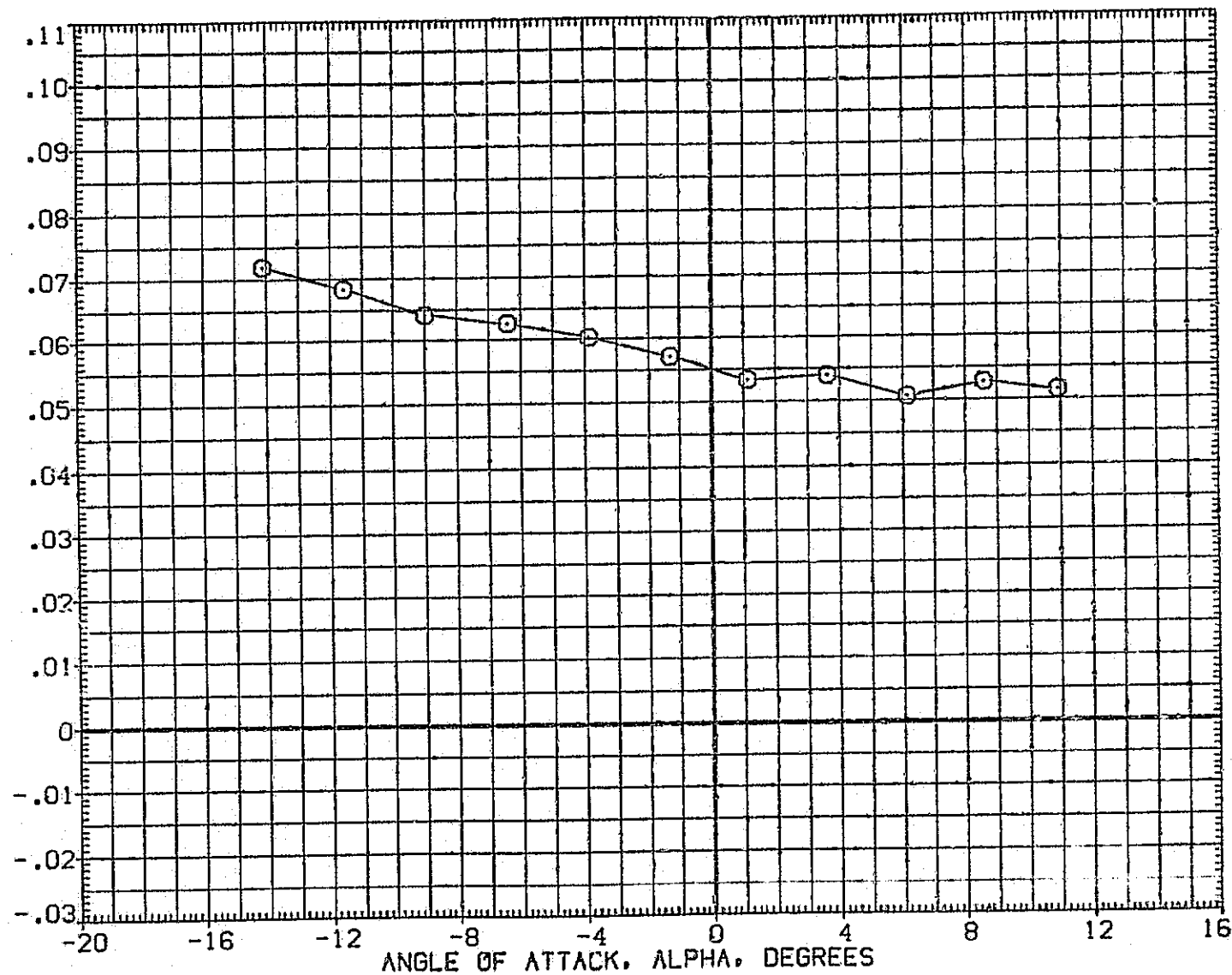


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC S94(A33) 740TS (TIPISIP201)	ORB STING
(AIC035)	DATA NOT AVAILABLE	
(AIC021)	MSFC S94(A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

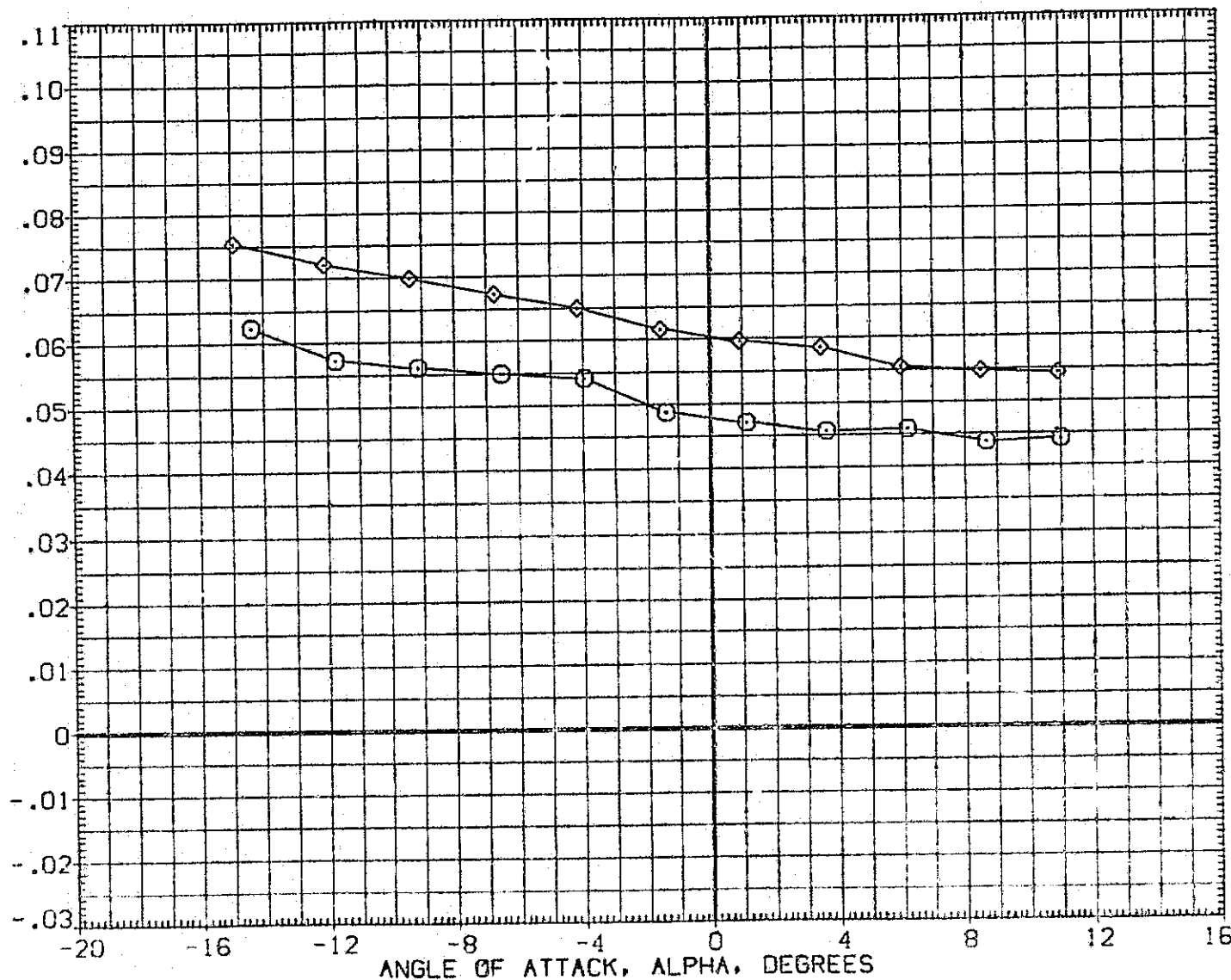


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LONGITUDINAL AERO
(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(IA33) 740TS (TIPISIP201)	ORB STING
(AIC035)	DATA NOT AVAILABLE	
(AIC021)	MSFC 594(IA33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

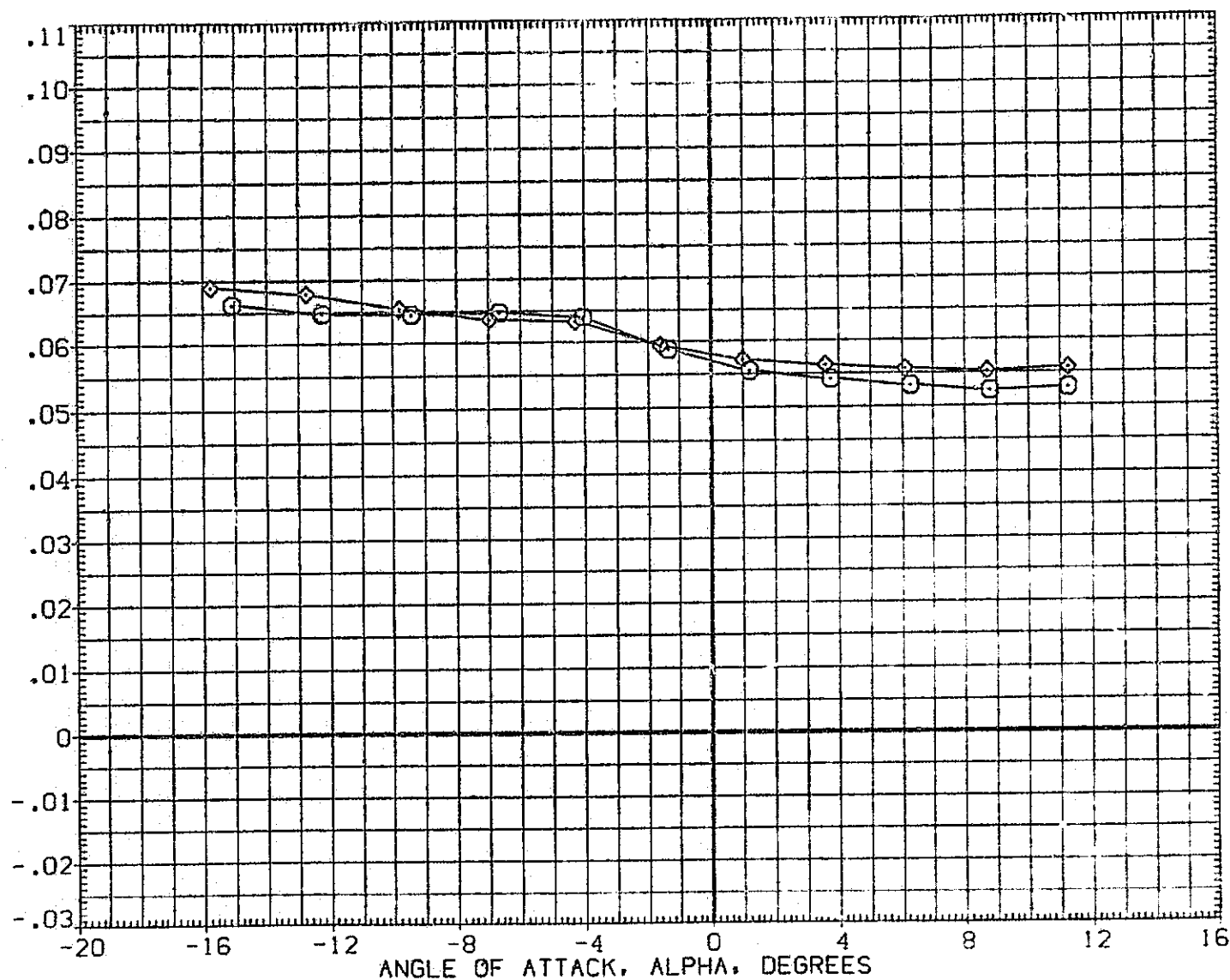


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(F)MACH = 1.25

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
[A1C007]	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
[A1C035]	DATA NOT AVAILABLE	
[A1C021]	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{ABO}

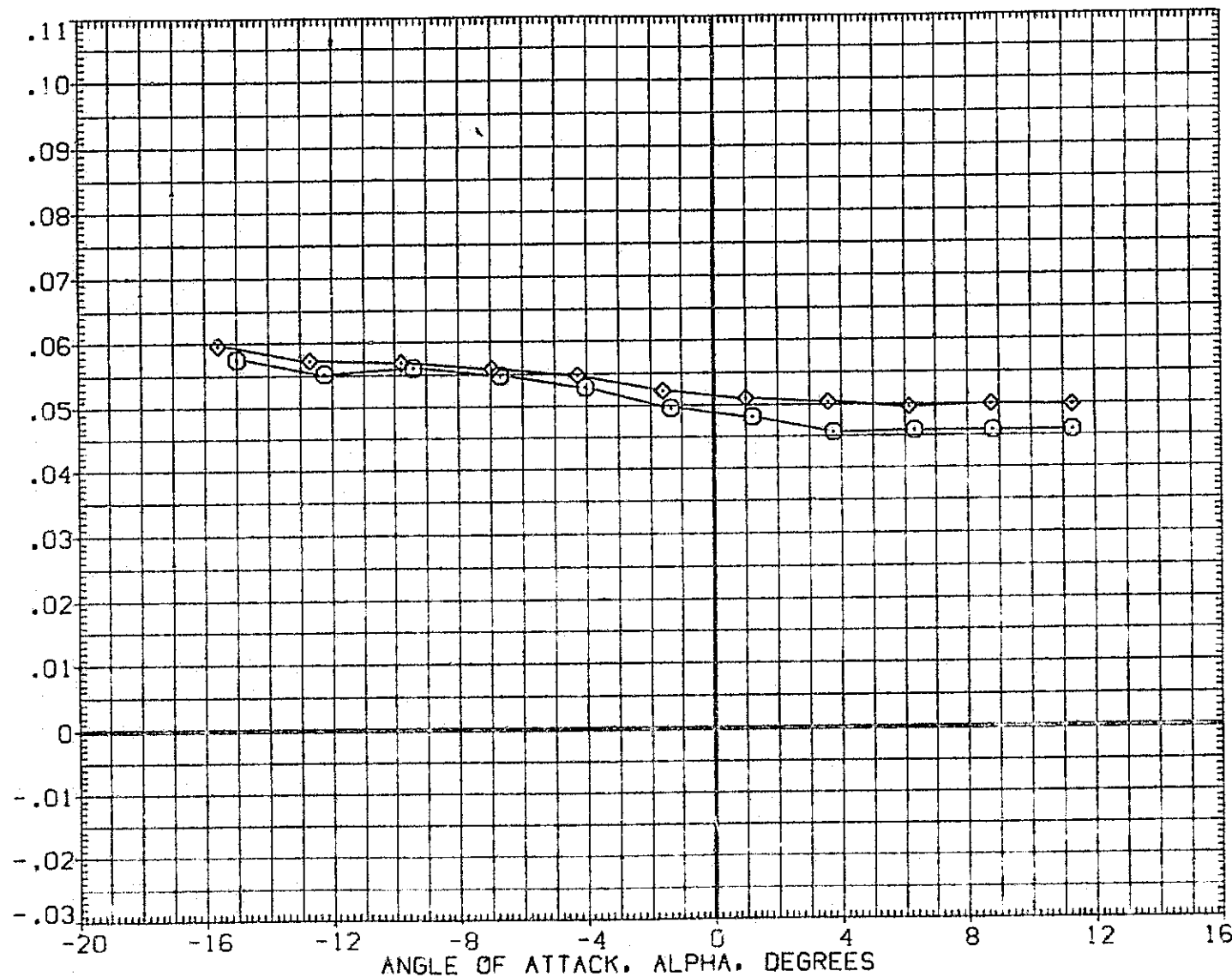


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(G)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
{AIC007}	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
{AIC035}	DATA NOT AVAILABLE	
{AIC021}	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

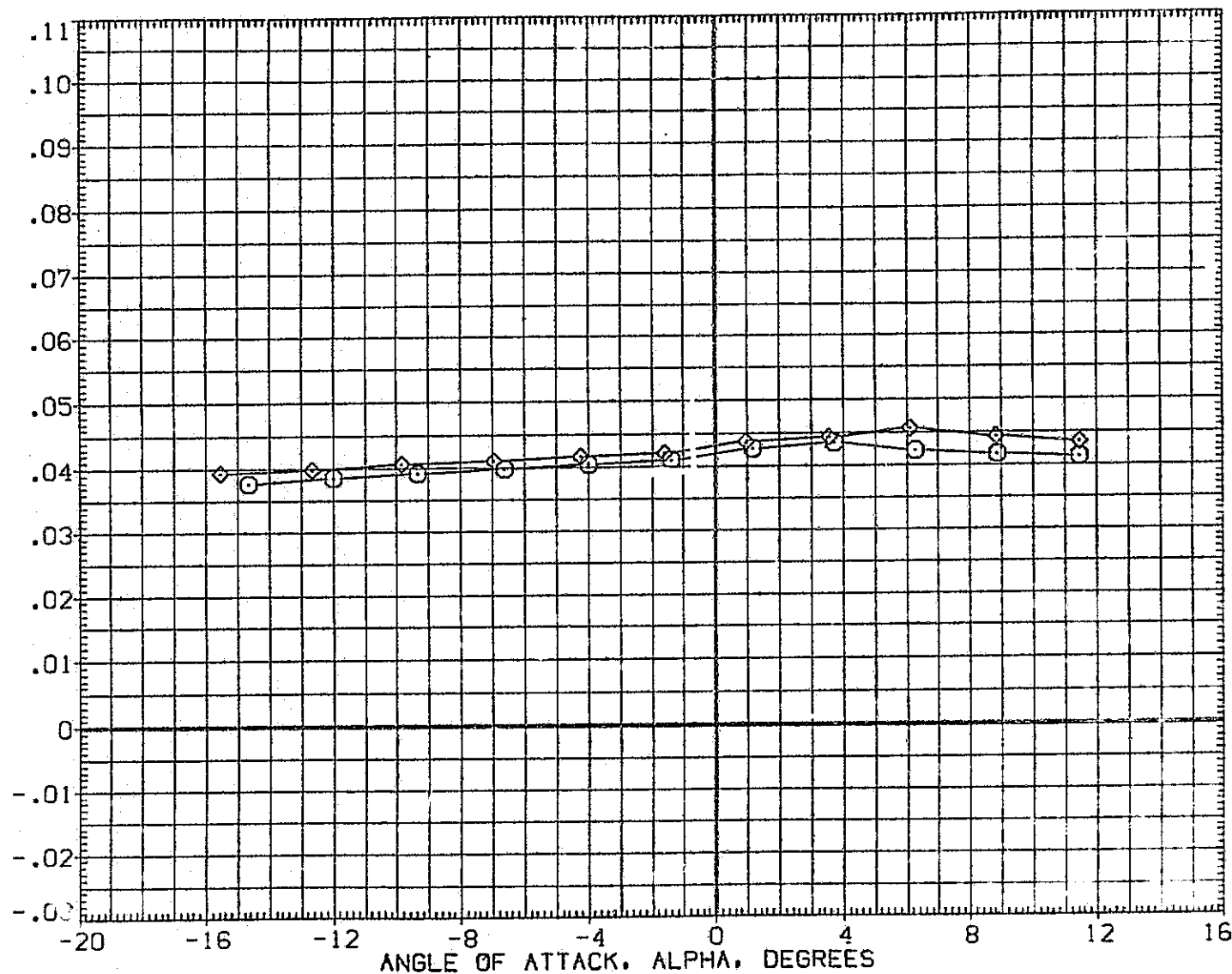


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LONGITUDINAL AERO

(H)MACH = 1.97

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(AIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(AIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

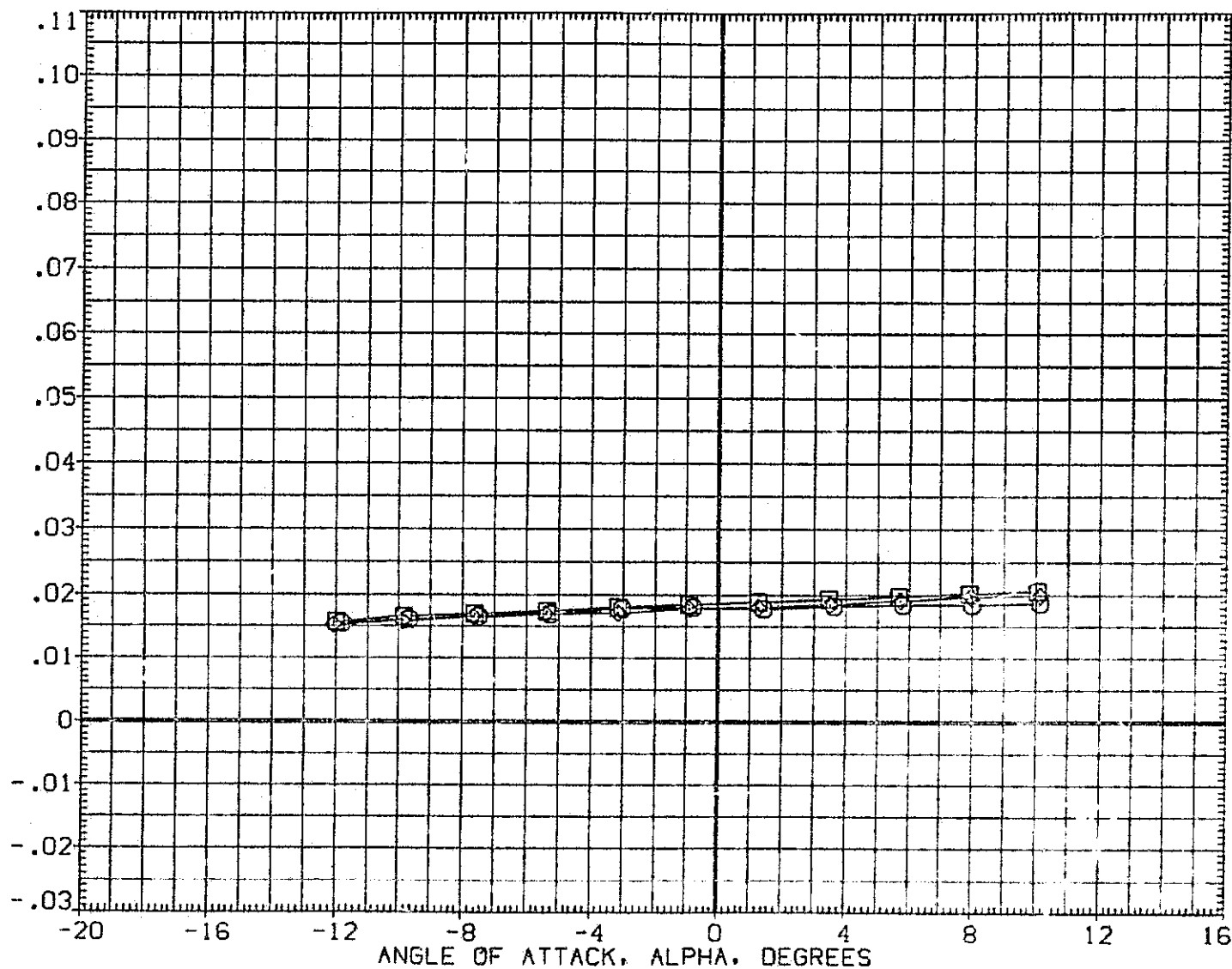


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LONGITUDINAL AERO

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC007)	MSFC 594(1A33) 740TS (TIPIS1P201)	ORB STING
(AIC035)	MSFC 594(1A33) 740TS (TIPIS3P201F2)	ORB STING
(AIC021)	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ORBITER BASE AXIAL FORCE COEFFICIENT, C_{AB0}

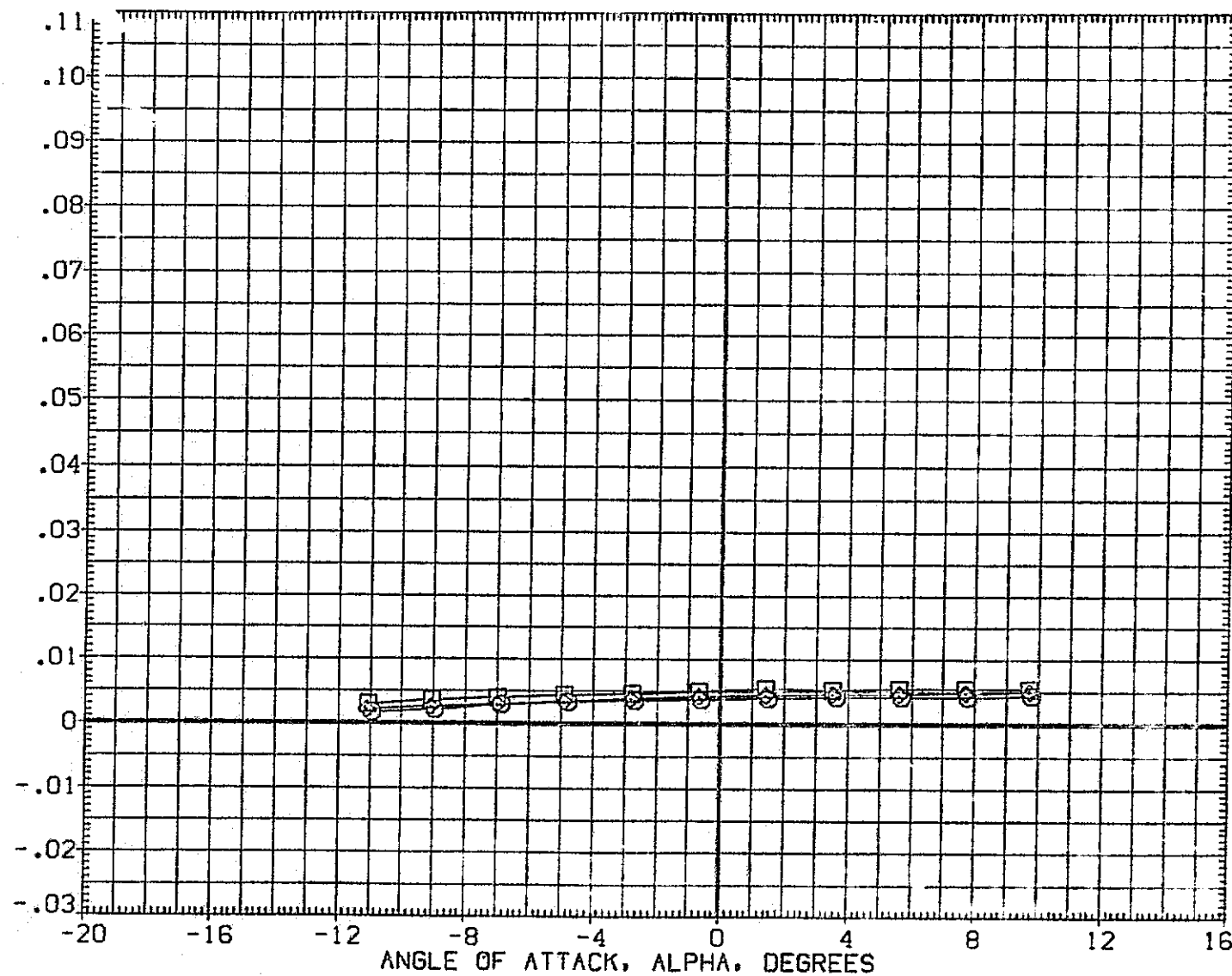


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LONGITUDINAL AERO

(J)MACH = 4.96

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC035)	○	MSFC 594(1A33) 740TS (TIPIS3P201F2)	ORB STING
(VIC021)	□	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING
(VIC007)	◇	MSFC 594(1A33) 740TS (TIPIS1P201)	ORB STING

REFERENCE INFORMATION

SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

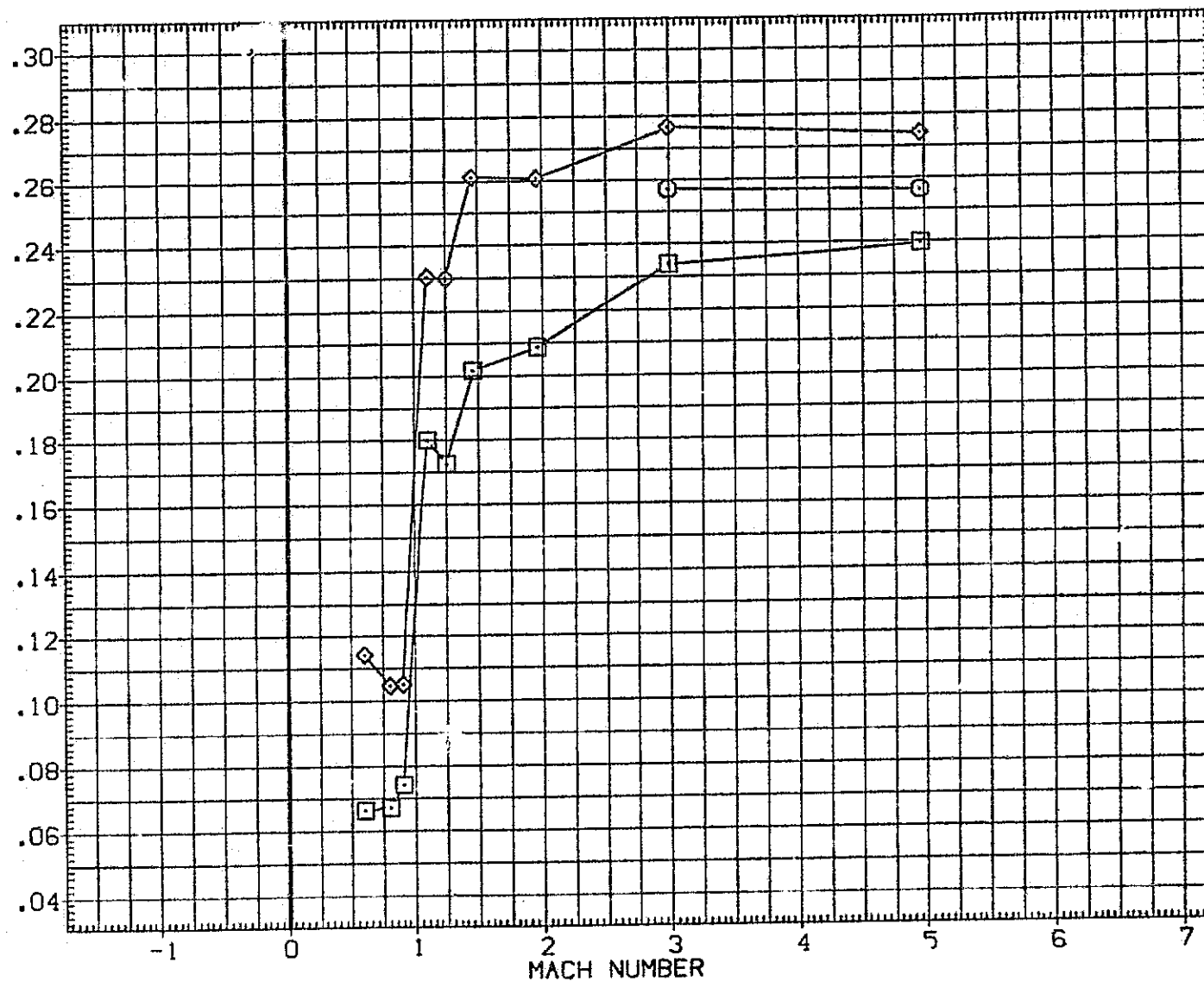


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(A) ALPHA = -10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
[VIC035]	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
[VIC021]	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
[VIC007]	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

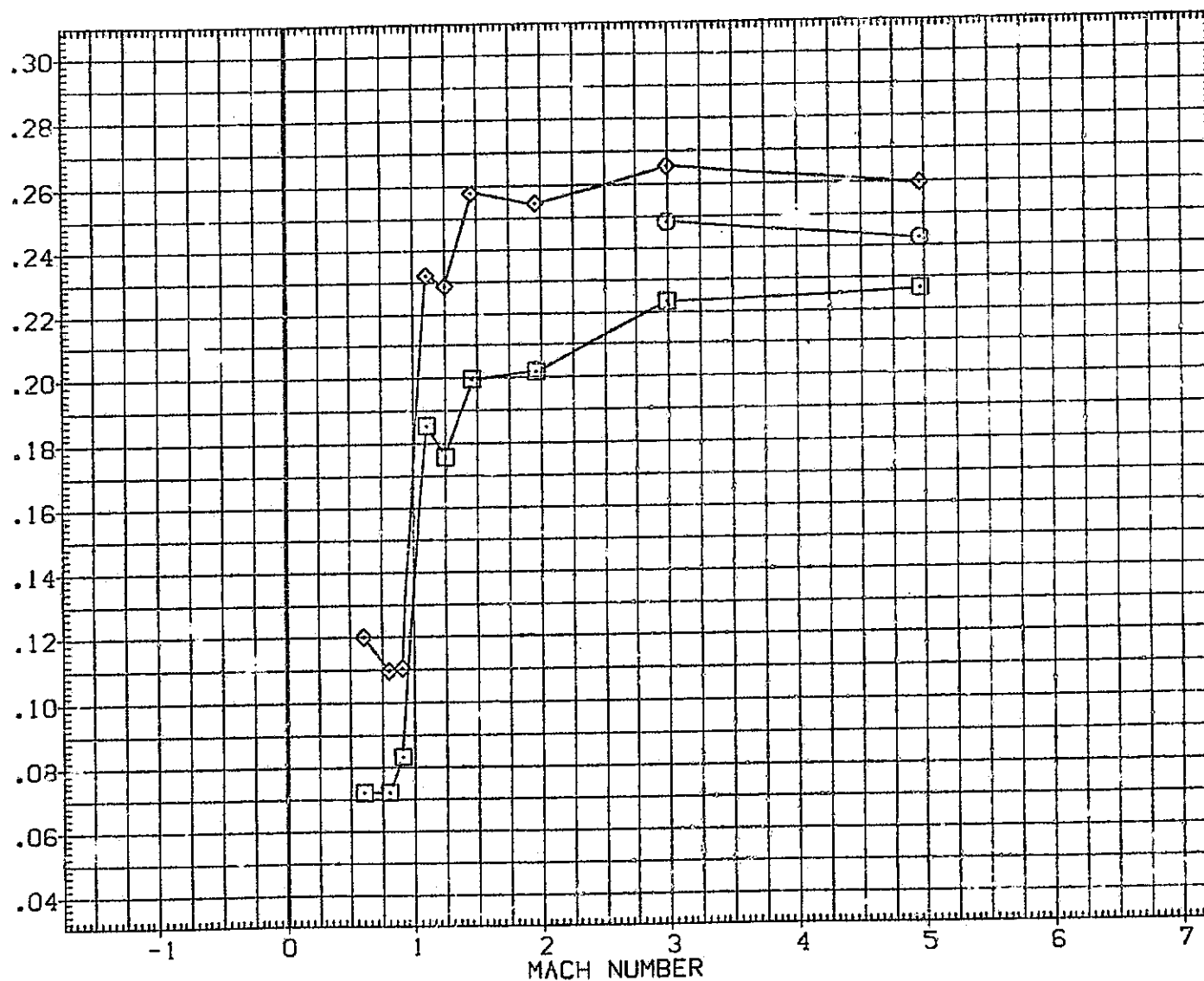


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(B) ALPHA = -8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P20IF2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P20IF2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P20I)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

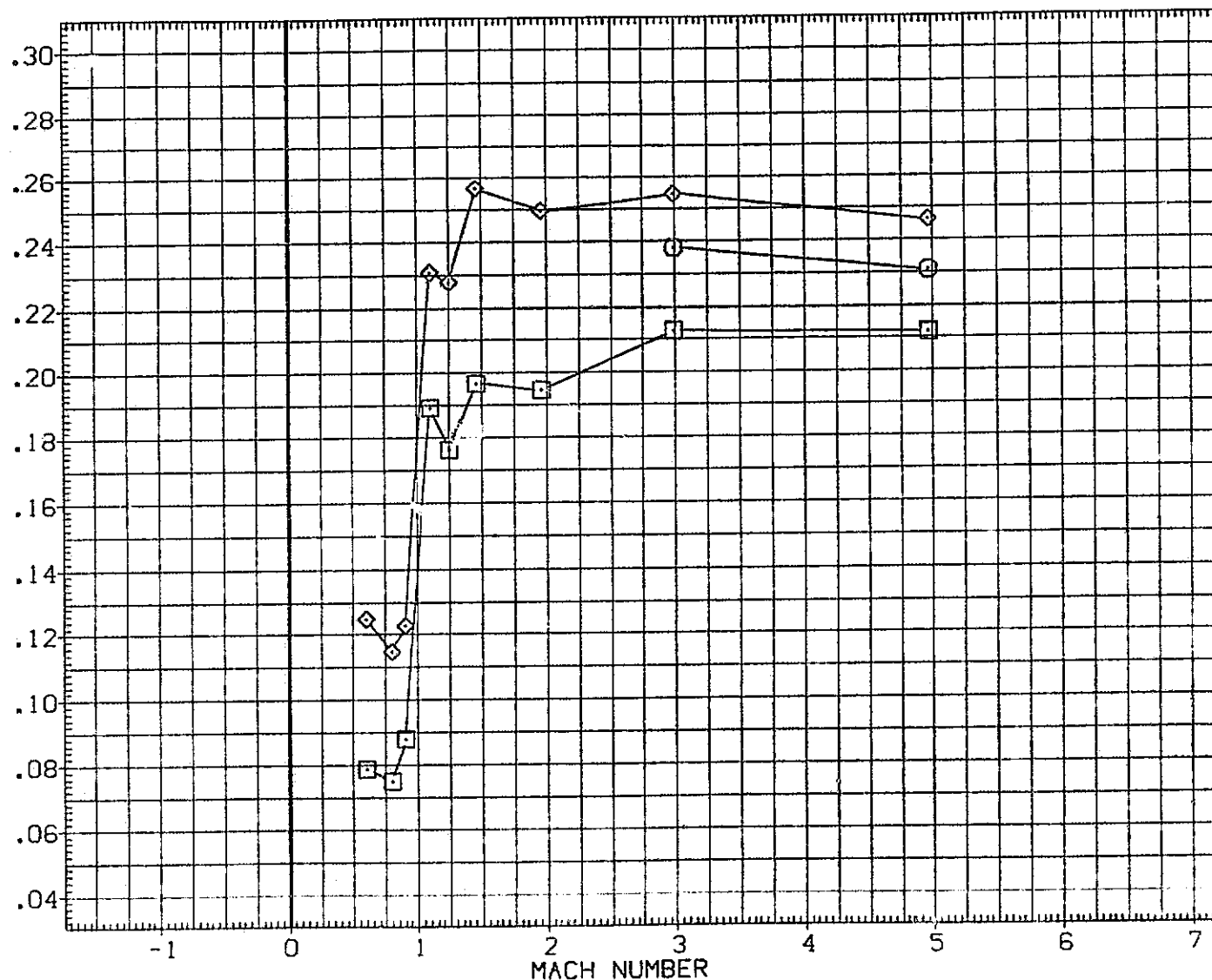


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(C) ALPHA = -6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

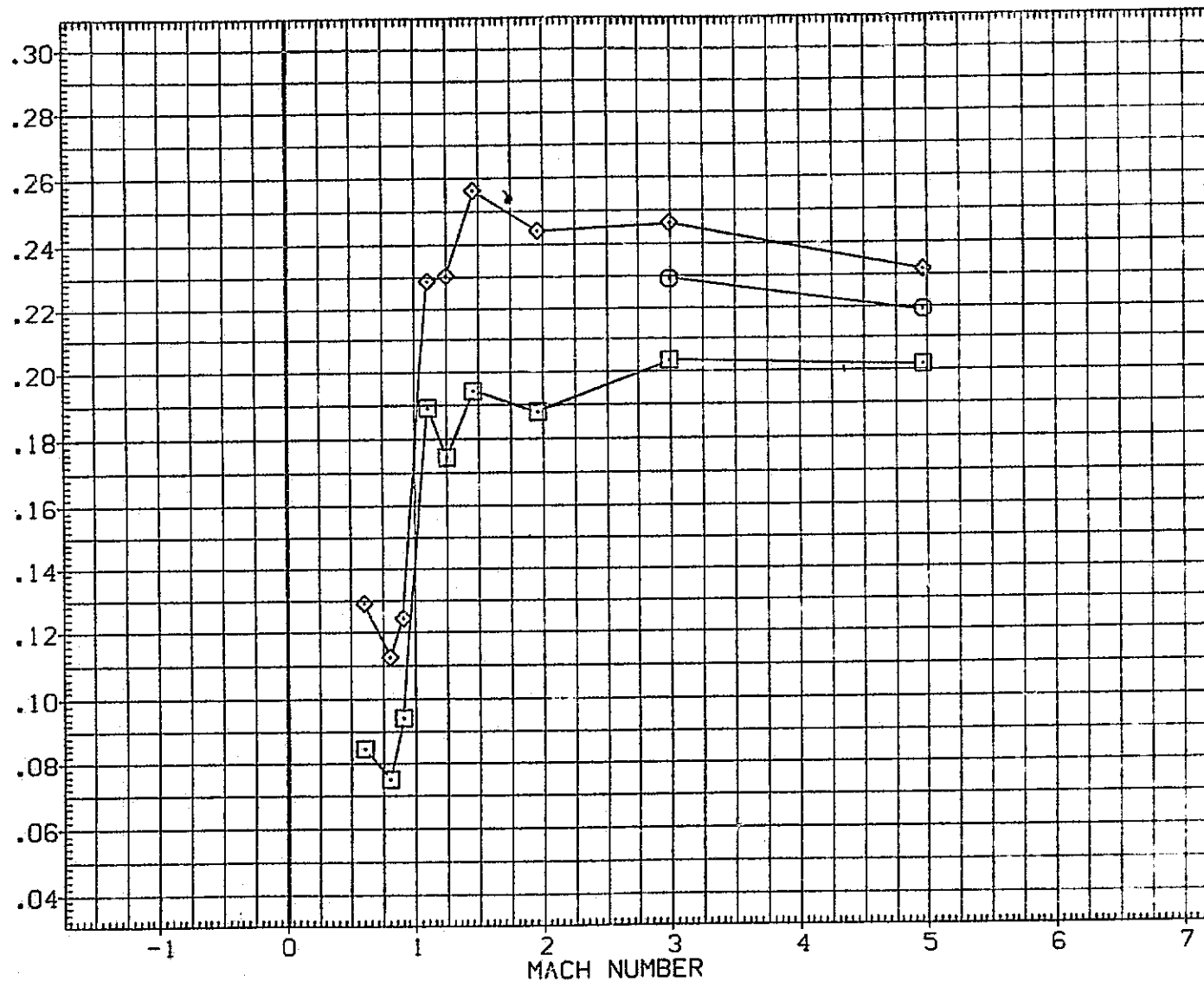


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(D)ALPHA = -4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC S94(1A33) 740TS (TIP1S3P201F2)	ORB STING
(VIC021)	MSFC S94(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC S94(1A33) 740TS (TIP1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

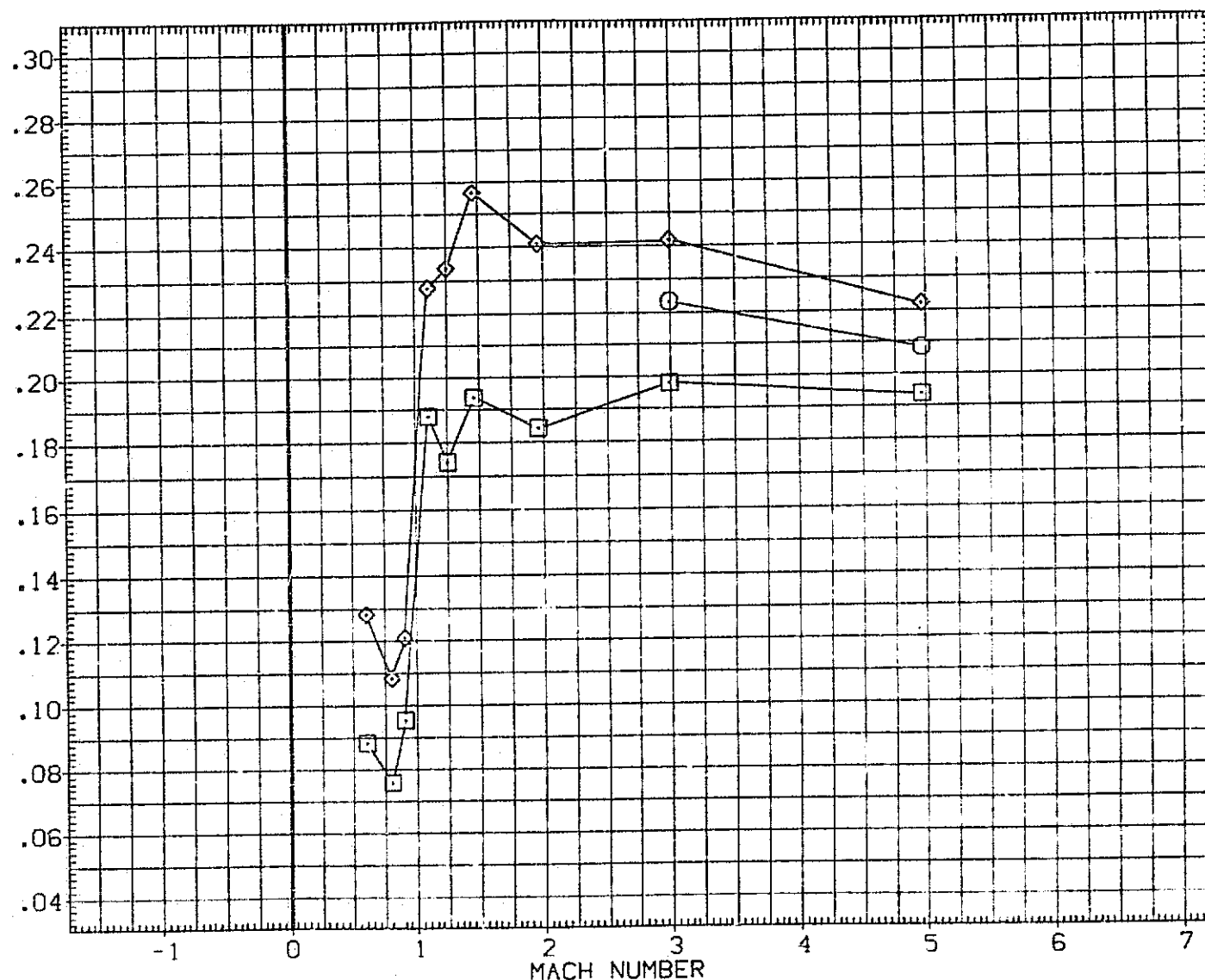


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(E) ALPHA = -2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC071)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1790.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

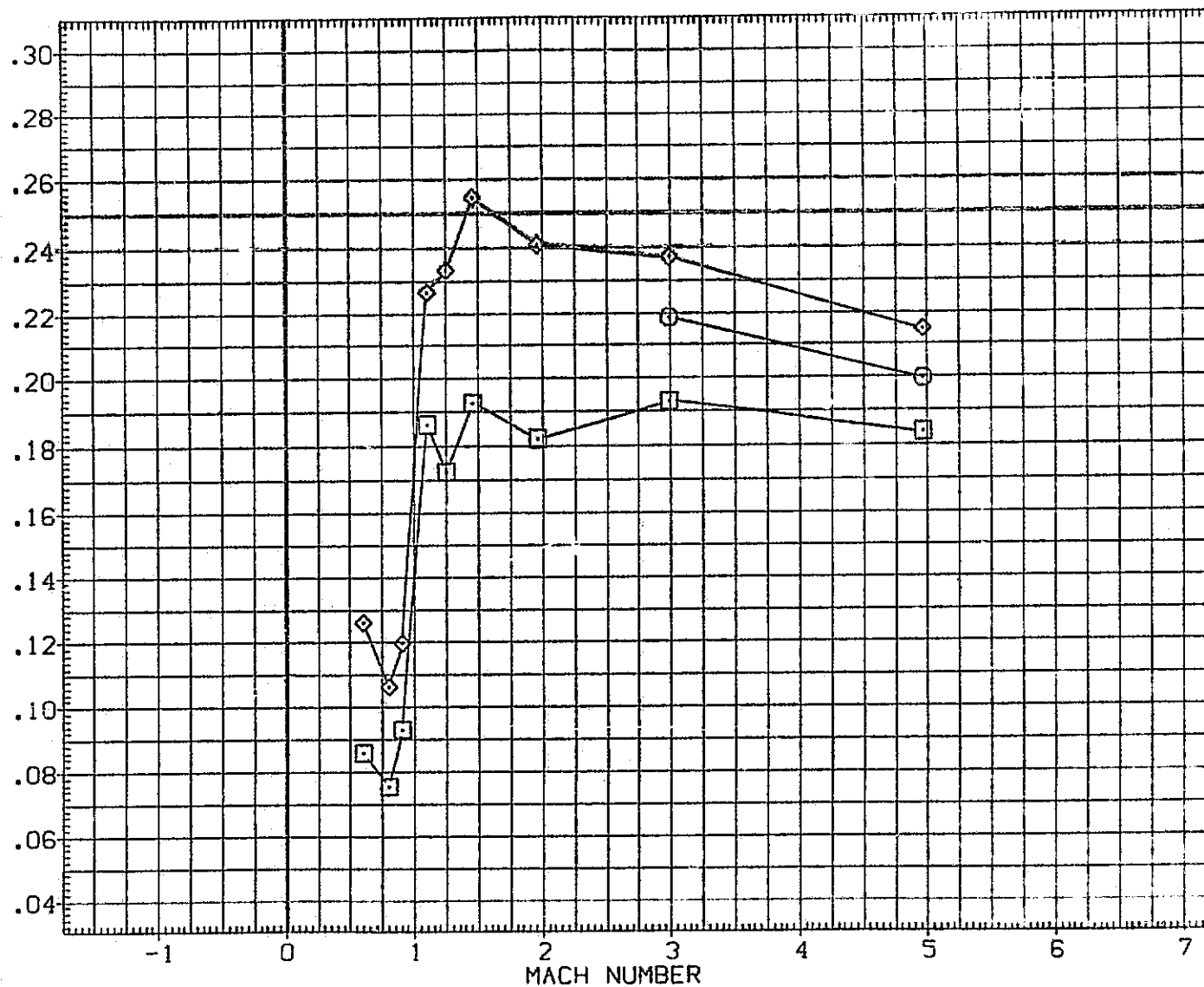


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(F) ALPHA = .00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FJREBODY AXIAL FORCE COEFFICIENT, CAF

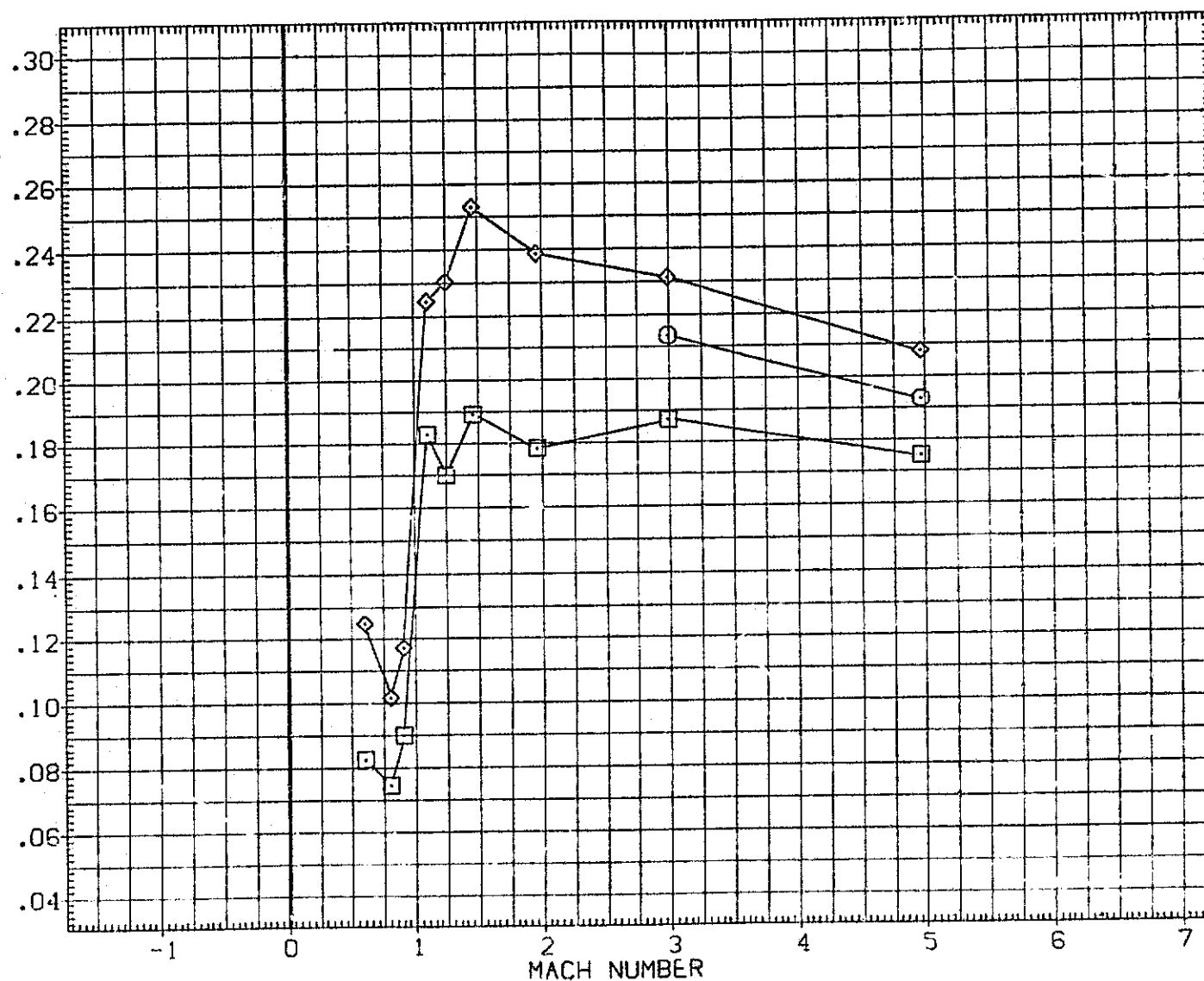


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(G) ALPHA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(IA33) 740TS (TIPIS3P201F2)	ORB STING
(VIC021)	MSFC 594(IA33) 740TS (T2PIS3P201F2)	ORB STING
(VIC007)	MSFC 594(IA33) 740TS (TIPIS1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

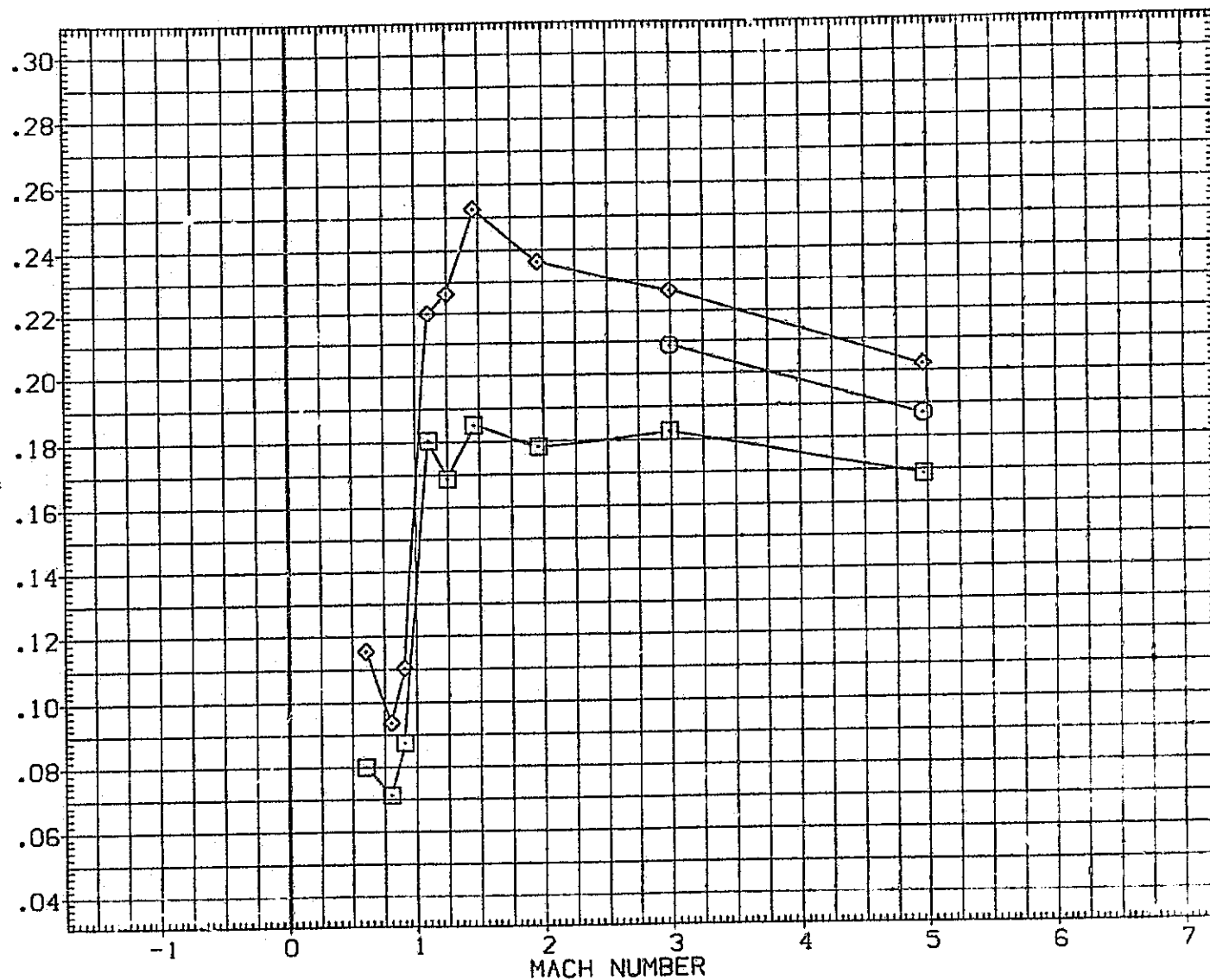


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(H) ALPHA = 4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

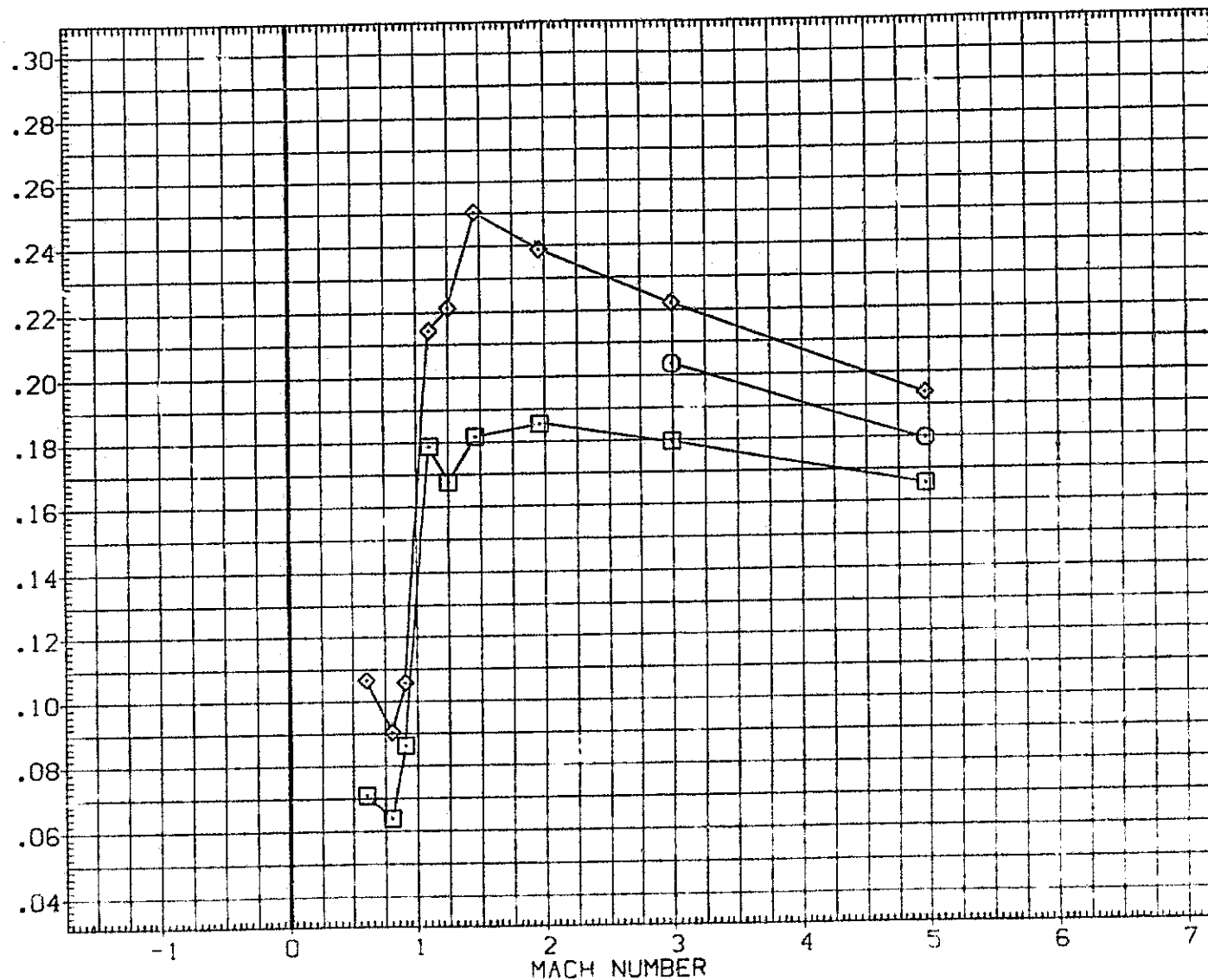


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(1) ALPHA = 6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2650.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

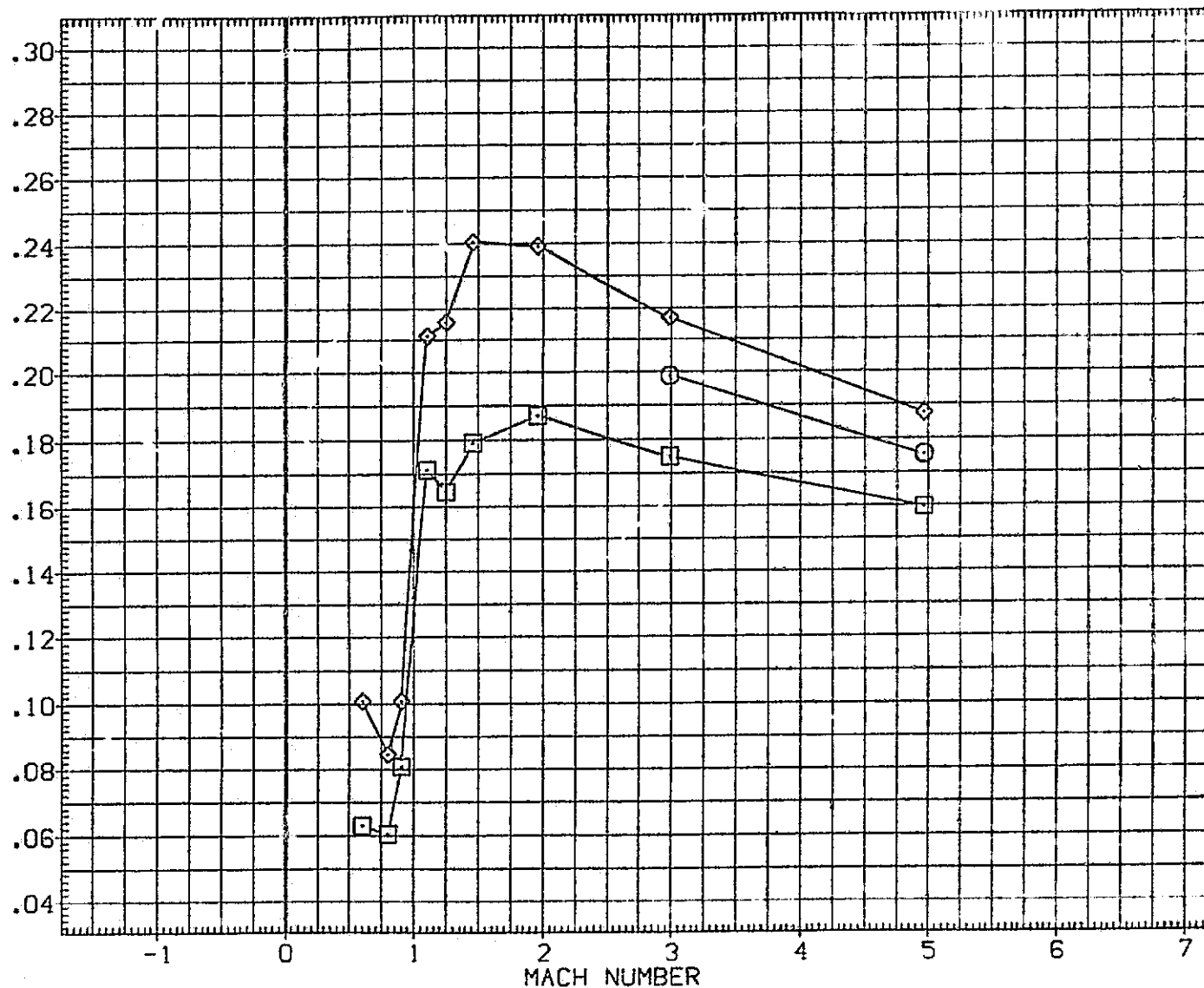


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(J)ALPHA = 8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (TIP1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

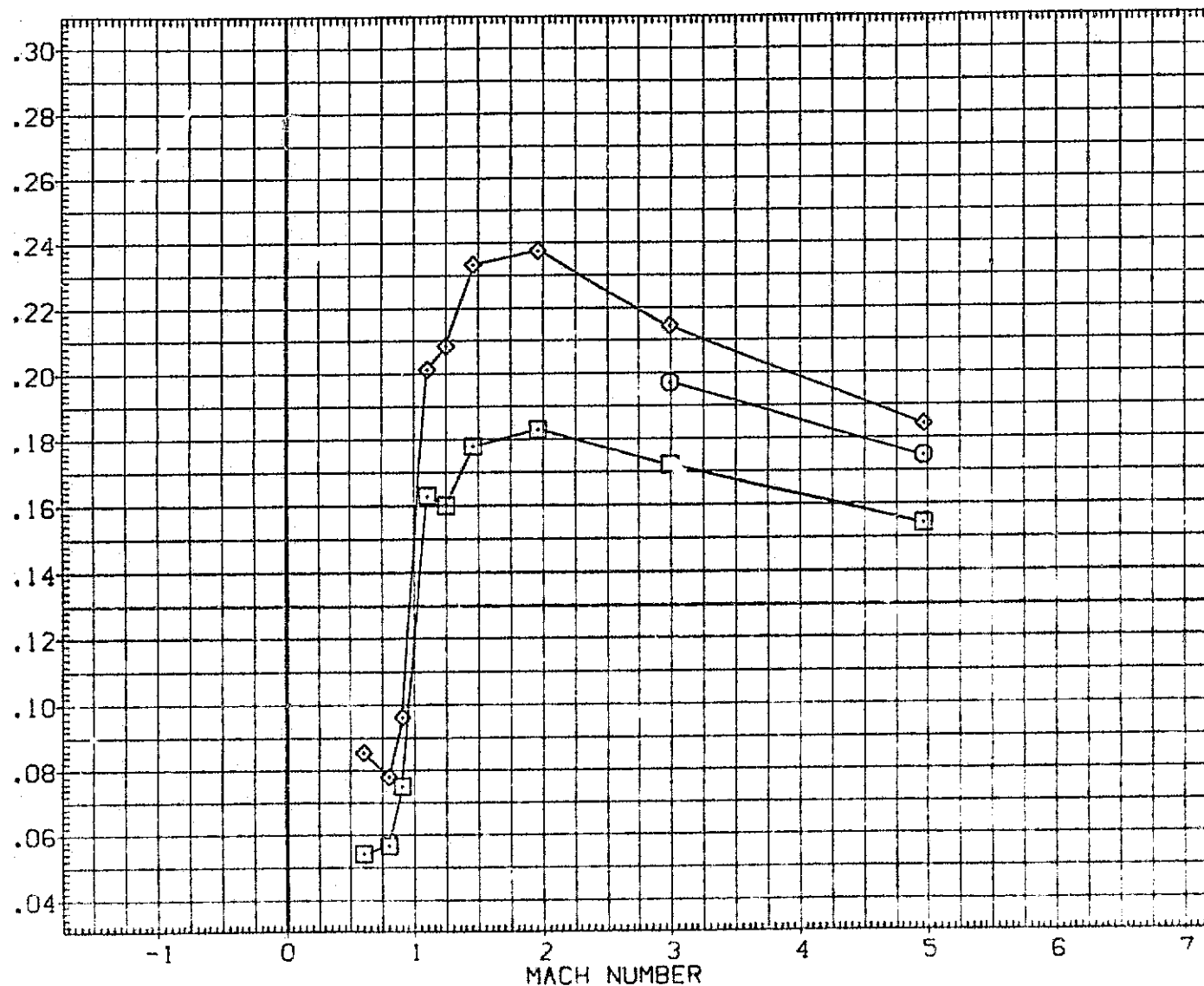


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(K)ALPHA = 10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(VIC035)	MSFC S94(A33) 740TS (T1P1S3P201F2) ORB STING
(VIC021)	MSFC S94(A33) 740TS (T2P1S3P201F2) ORB STING
(VIC007)	MSFC S94(A33) 740TS (T1P1S1P201) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

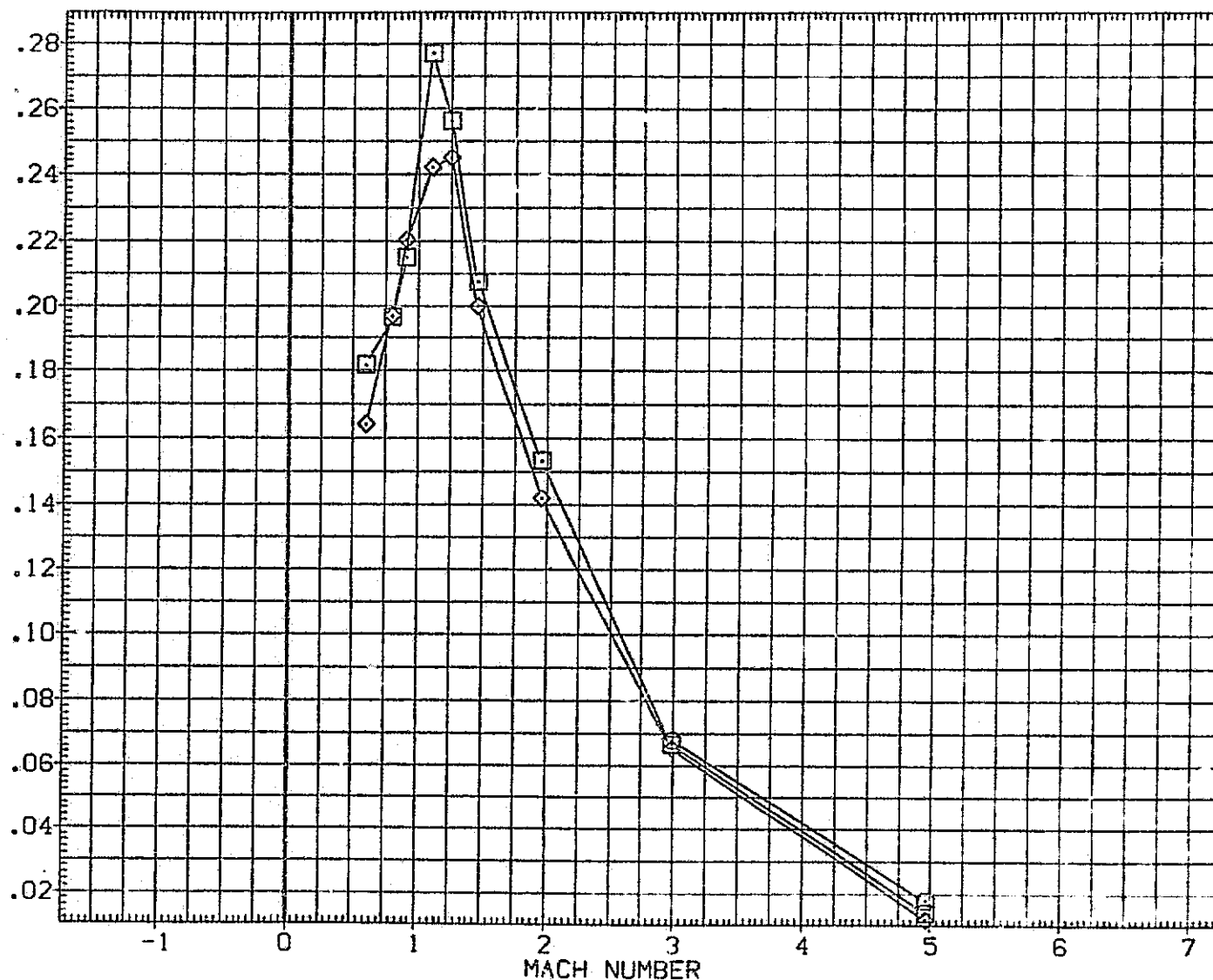


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(A) ALPHA = -10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB. ET AND SRB BASE AXIAL FORCE COEFFICIENTS.CABT

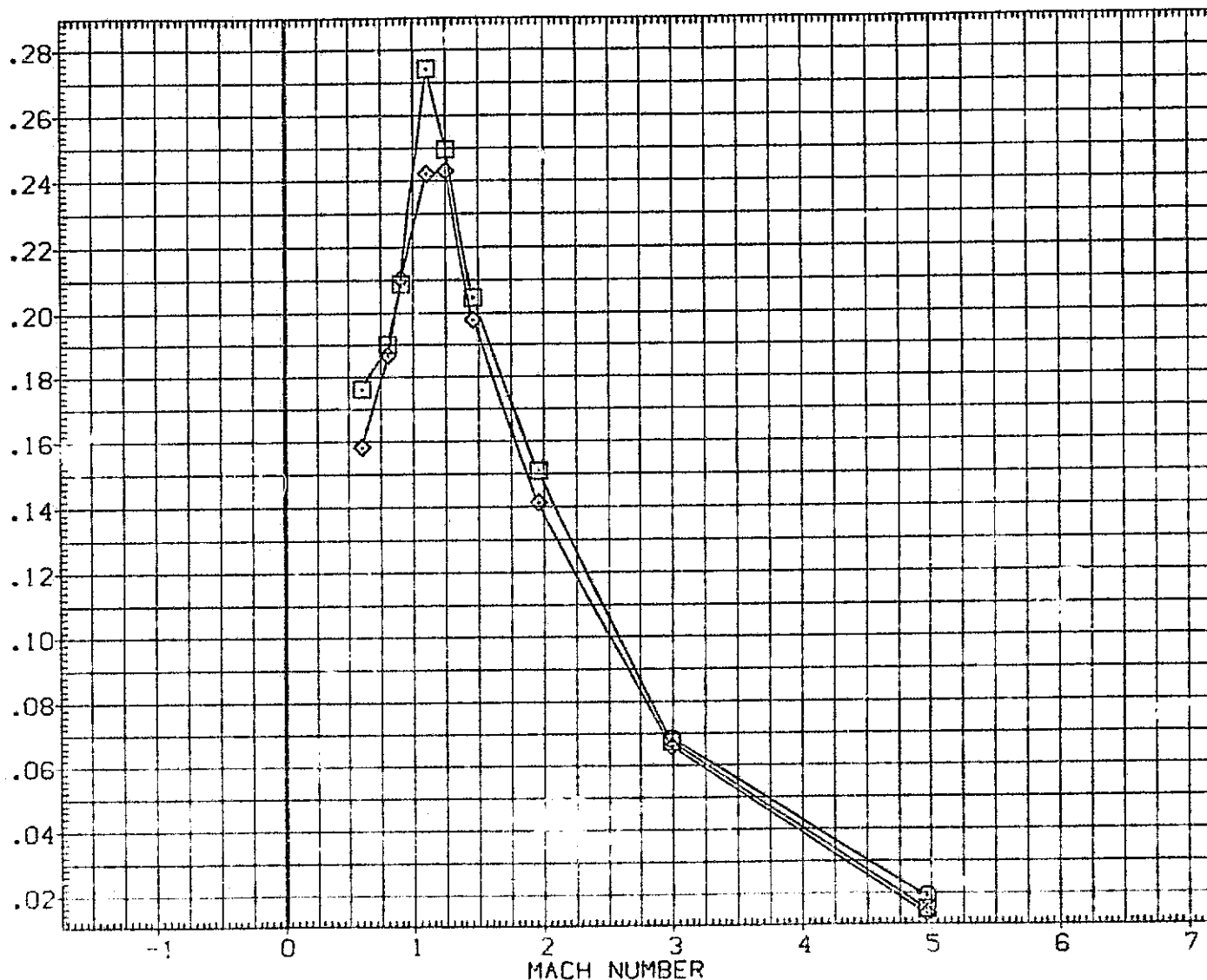


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(B) ALPHA = -8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SPEF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

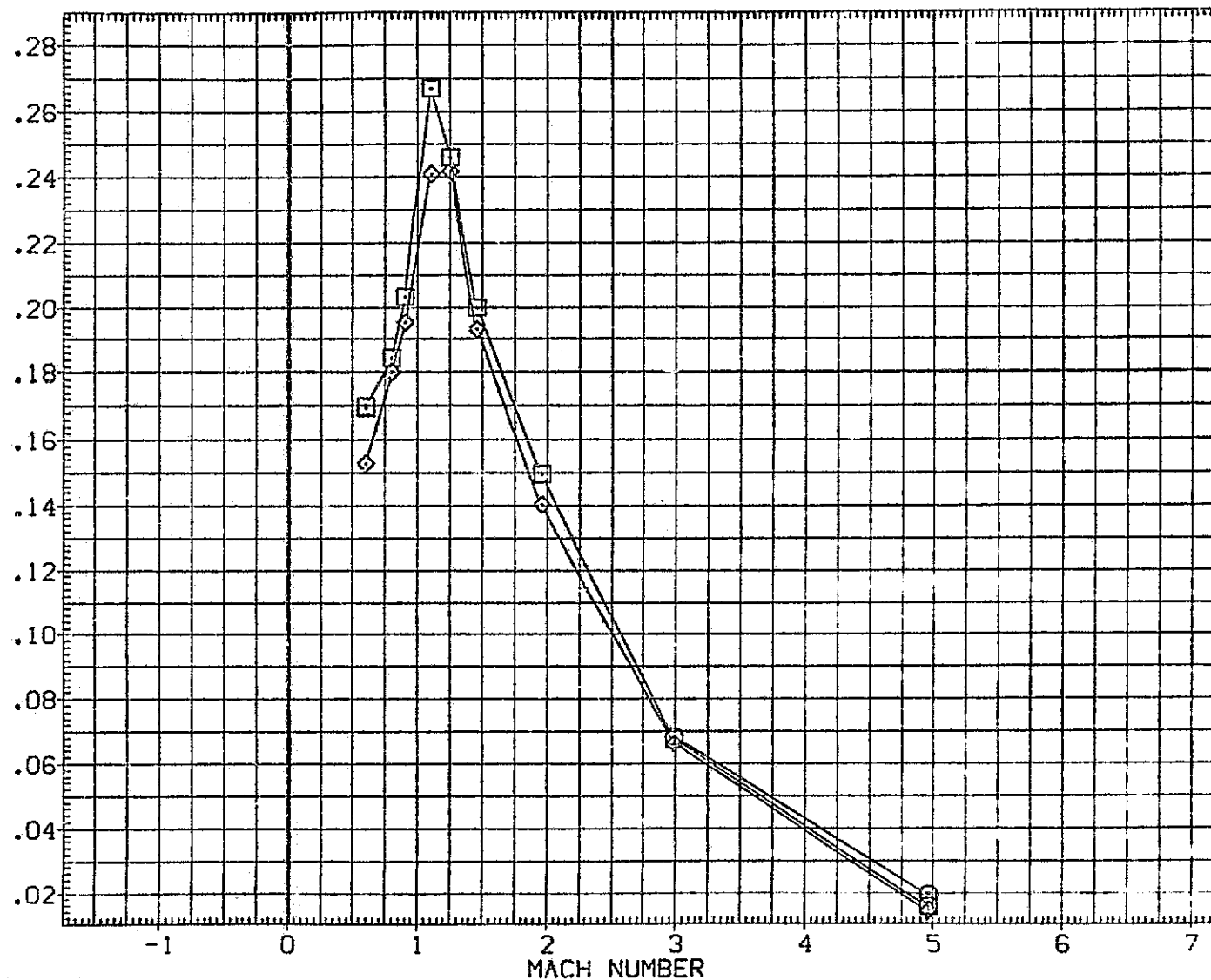


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(C) ALPHA = -6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM C_D THE ORB. ET AND SRB BASE AXIAL FORCE COEFFICIENTS. CABT

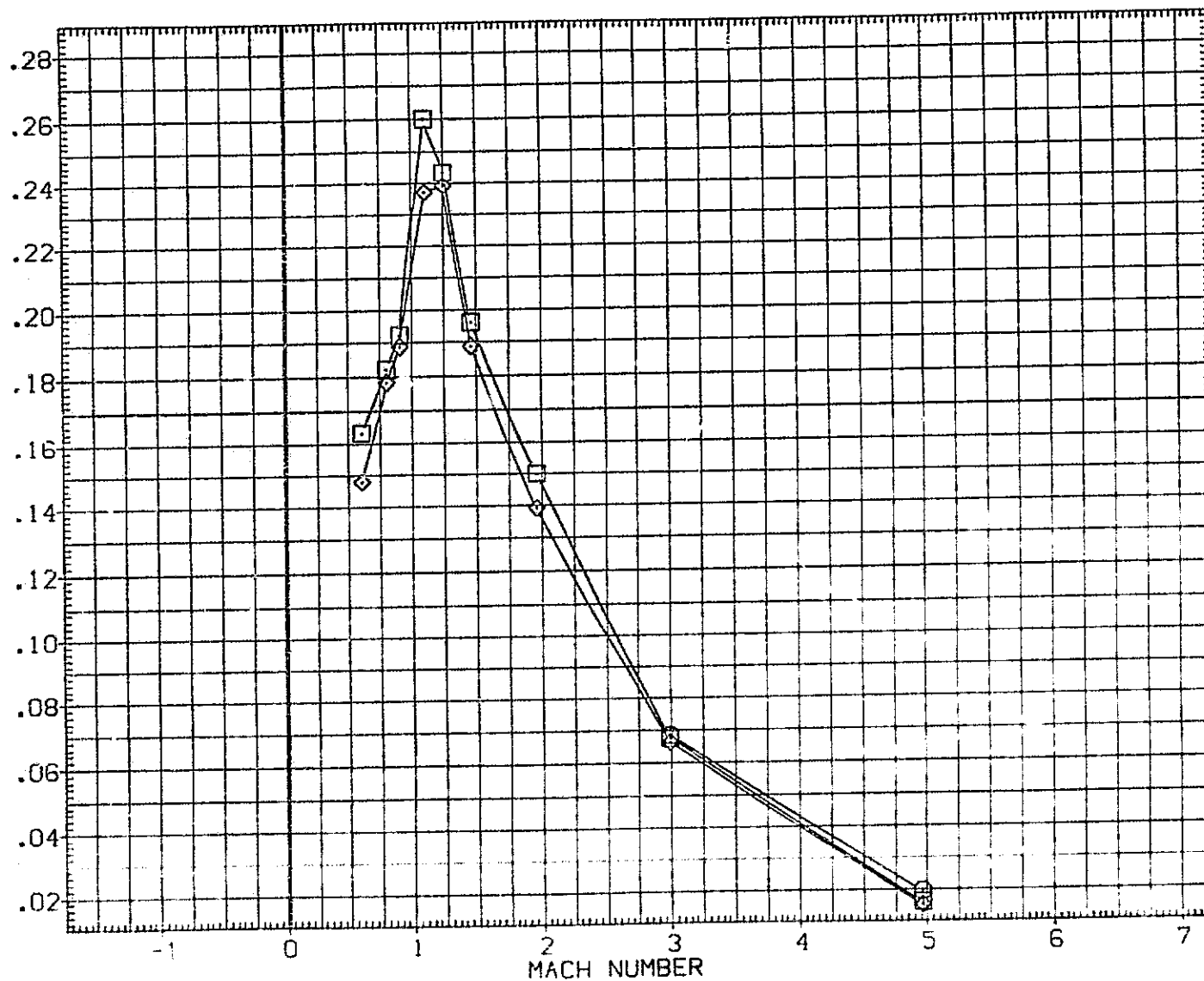


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(D) ALPHA = -4.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING

(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
YMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

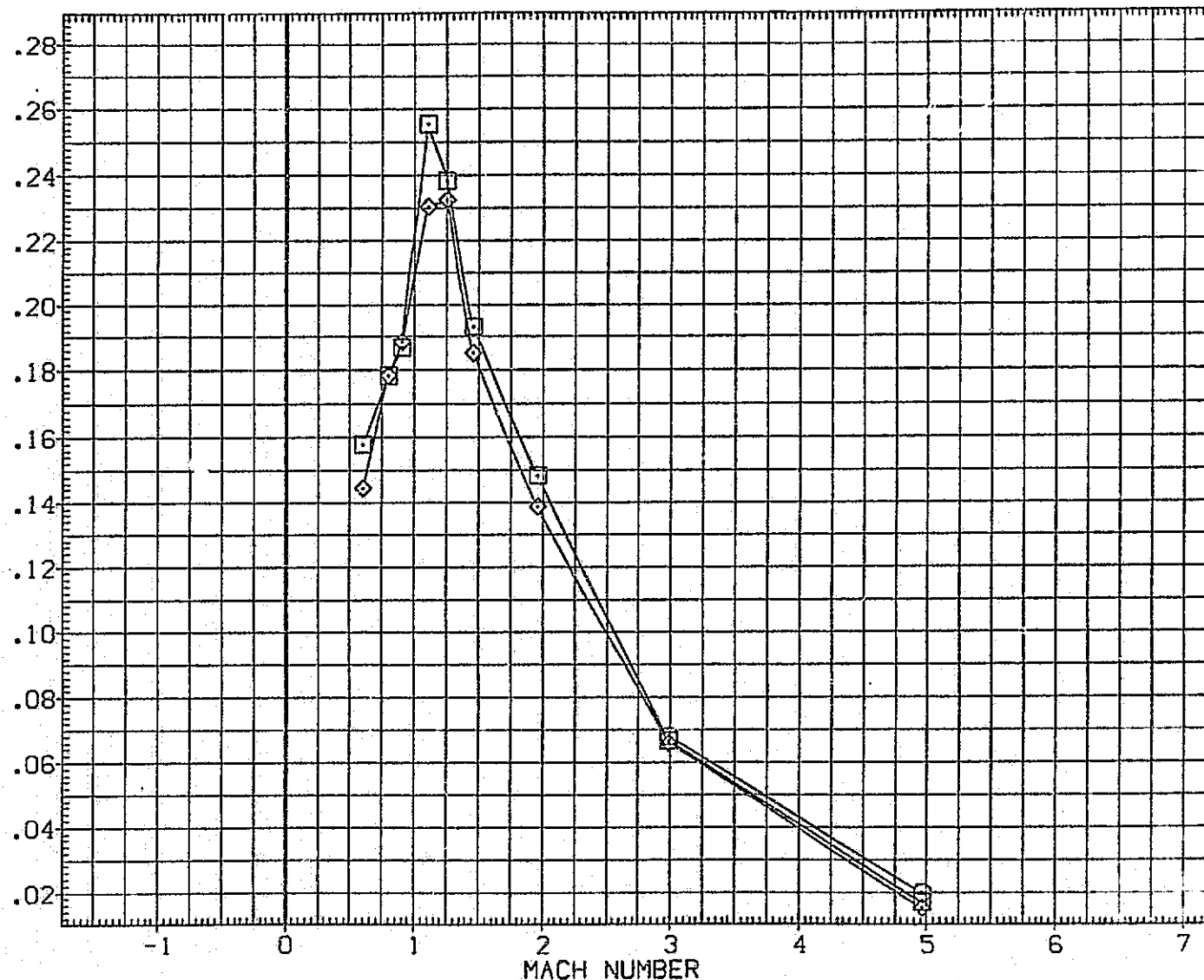


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(E) ALPHA = -2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1PIS3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1PISIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB. ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

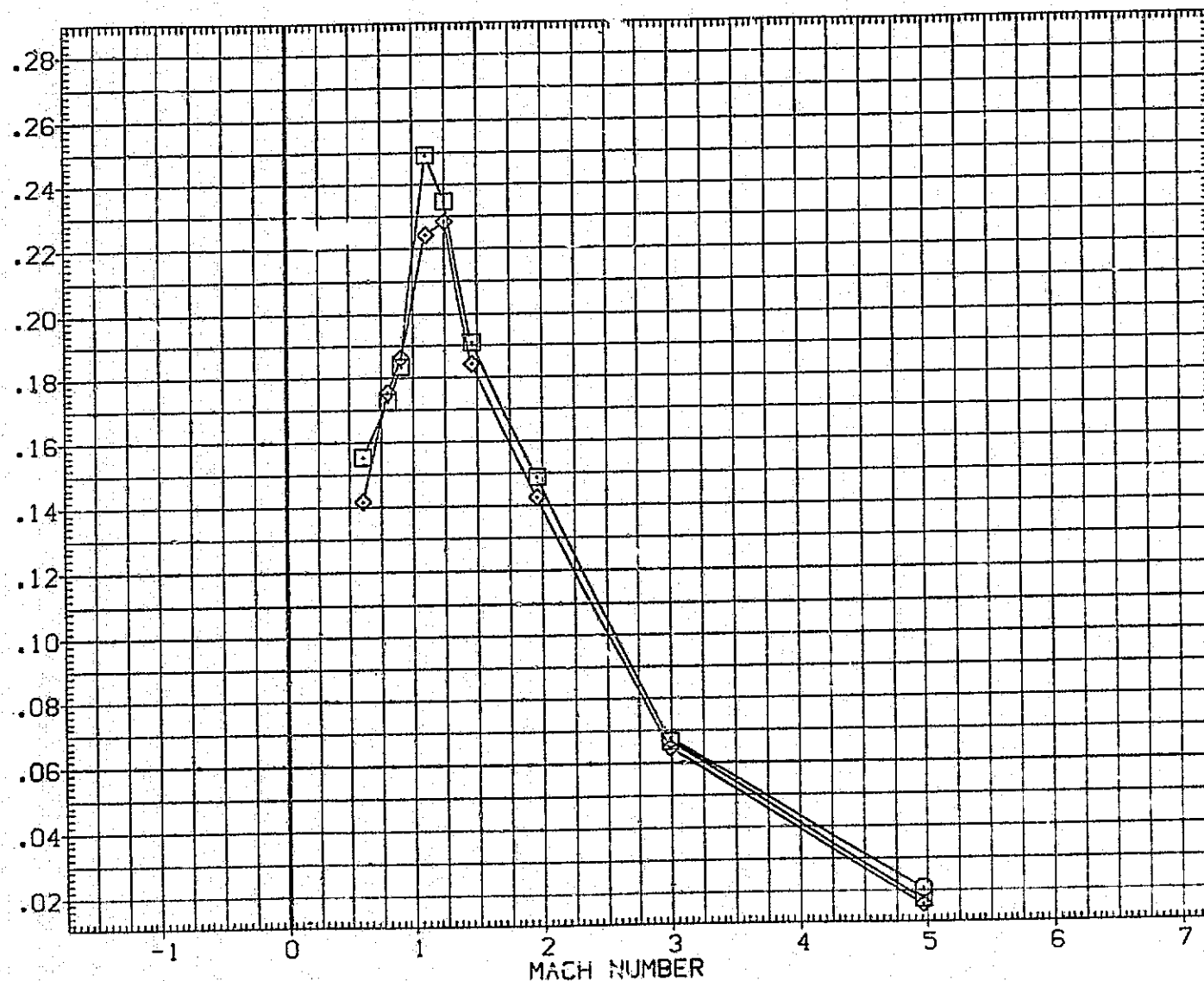


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(F) ALPHA = .00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

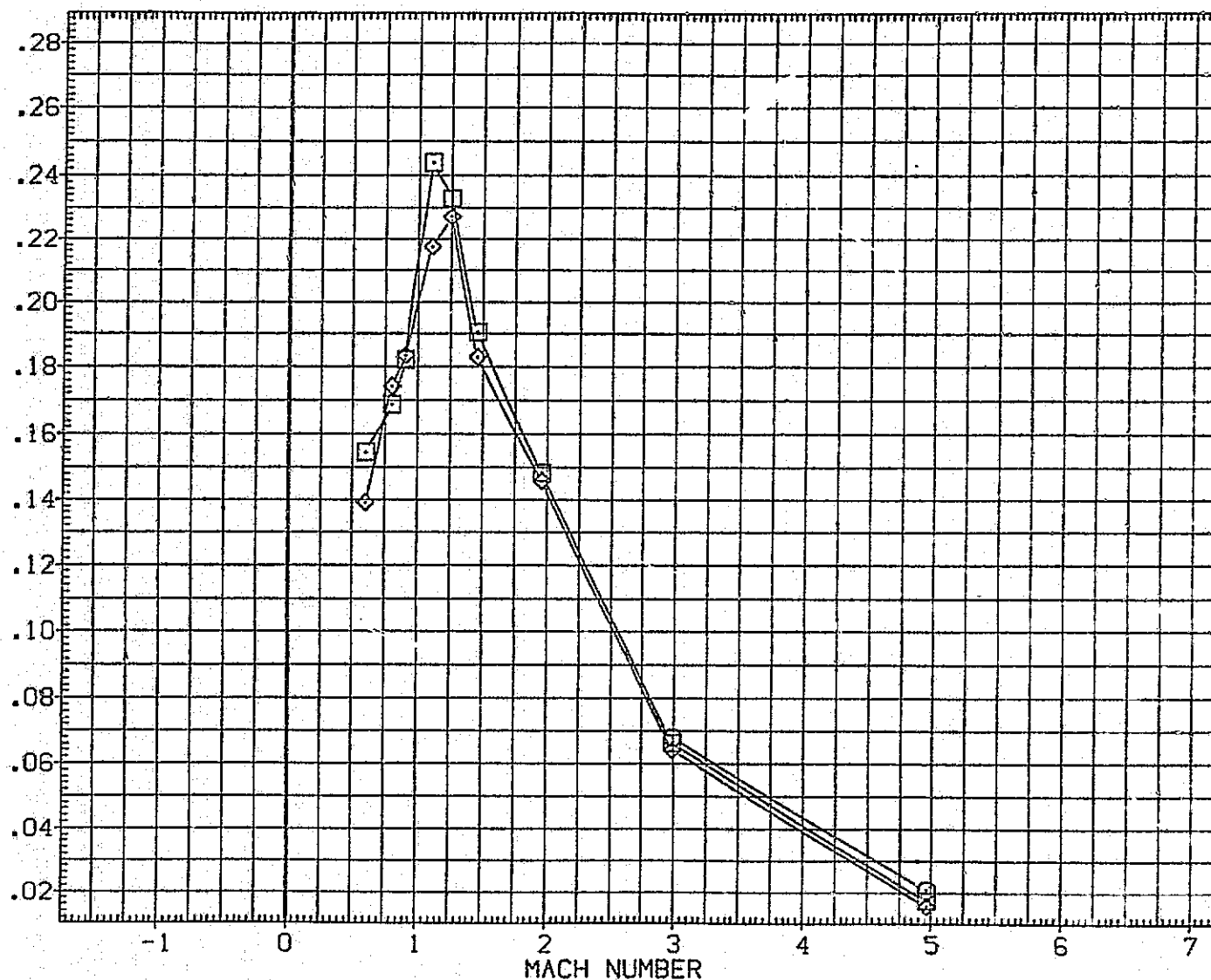


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(G) ALPHA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC S94(A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC S94(A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC S94(A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

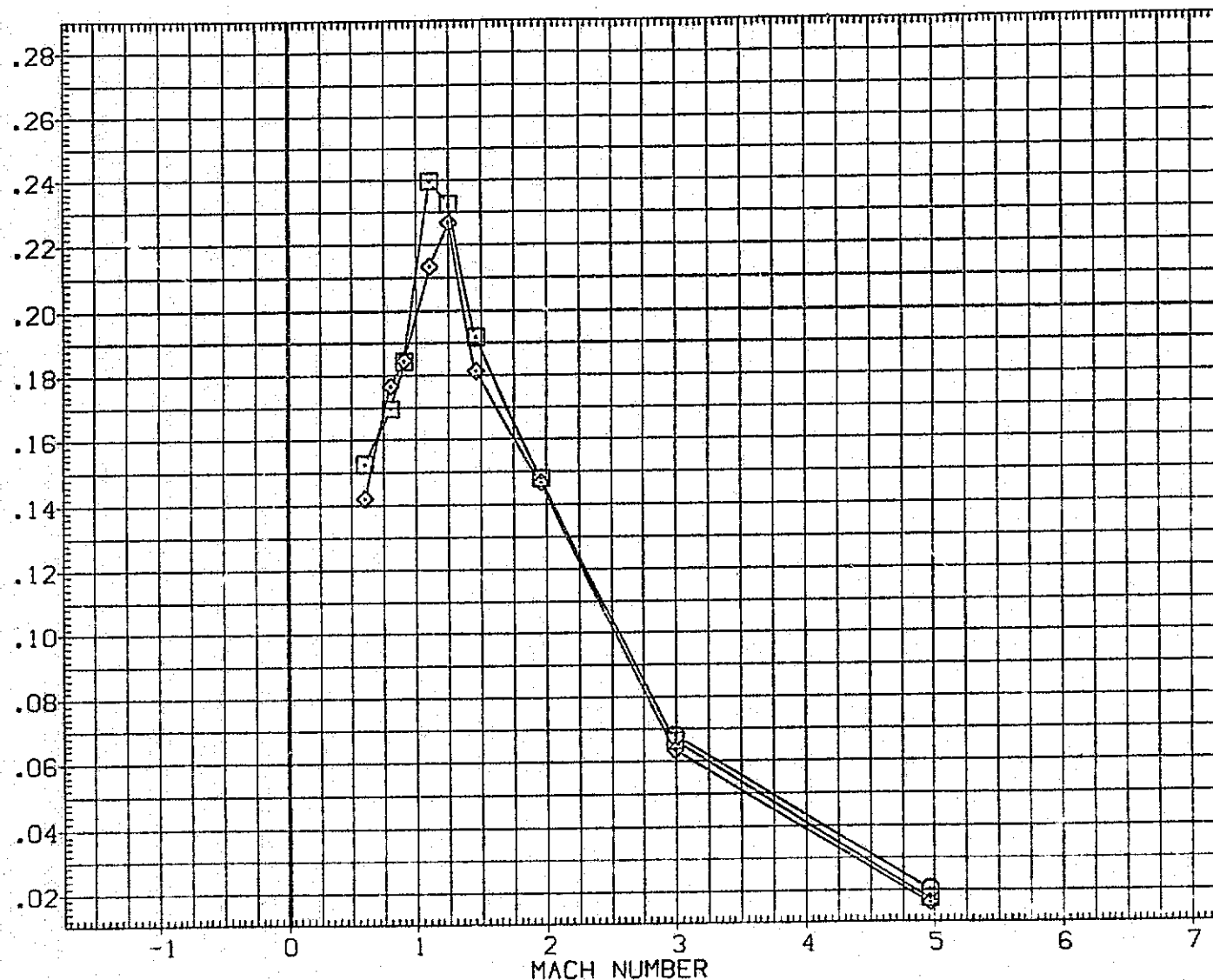


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(H)ALPHA = 4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

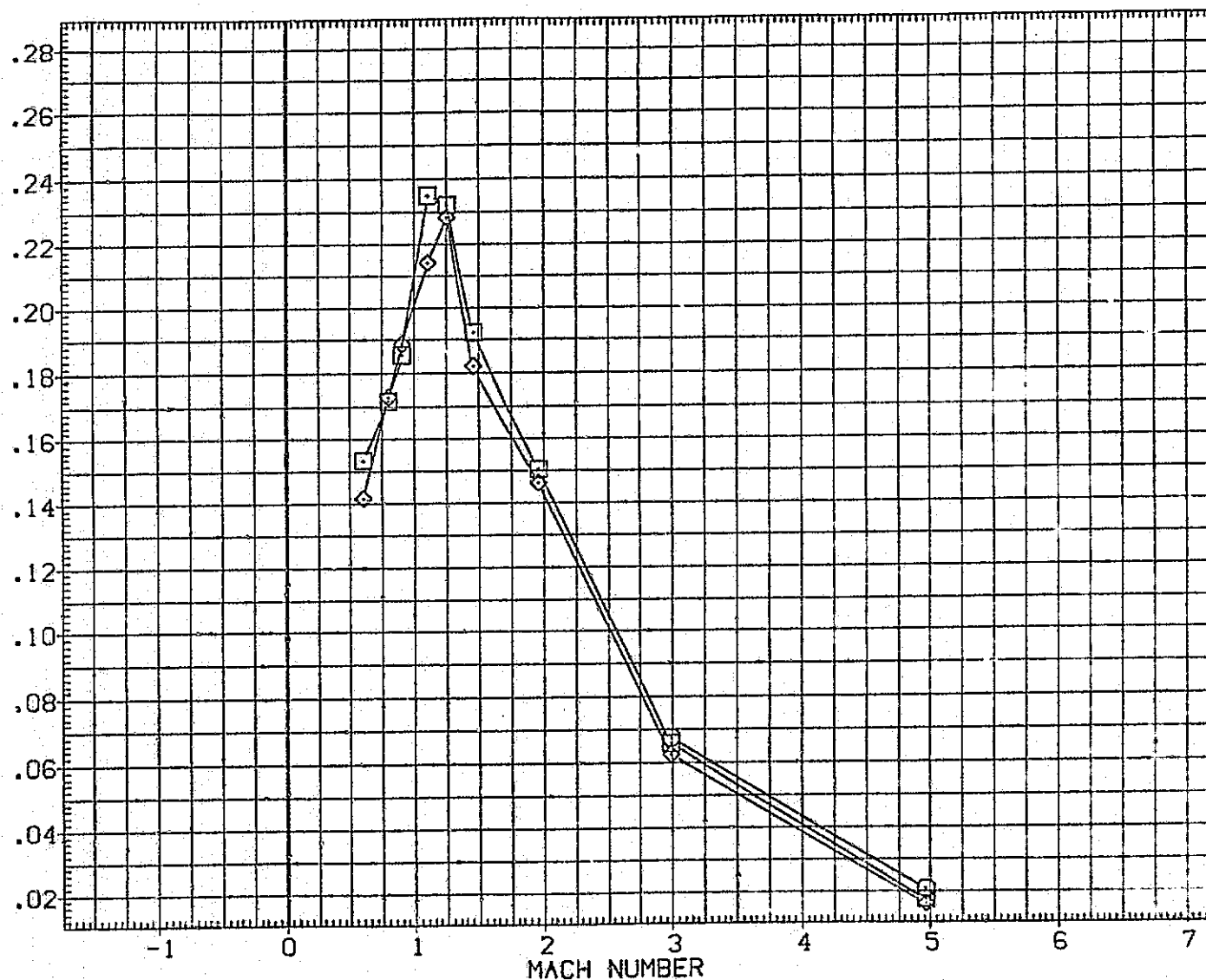


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(1) ALPHA = 6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (TIPIS3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

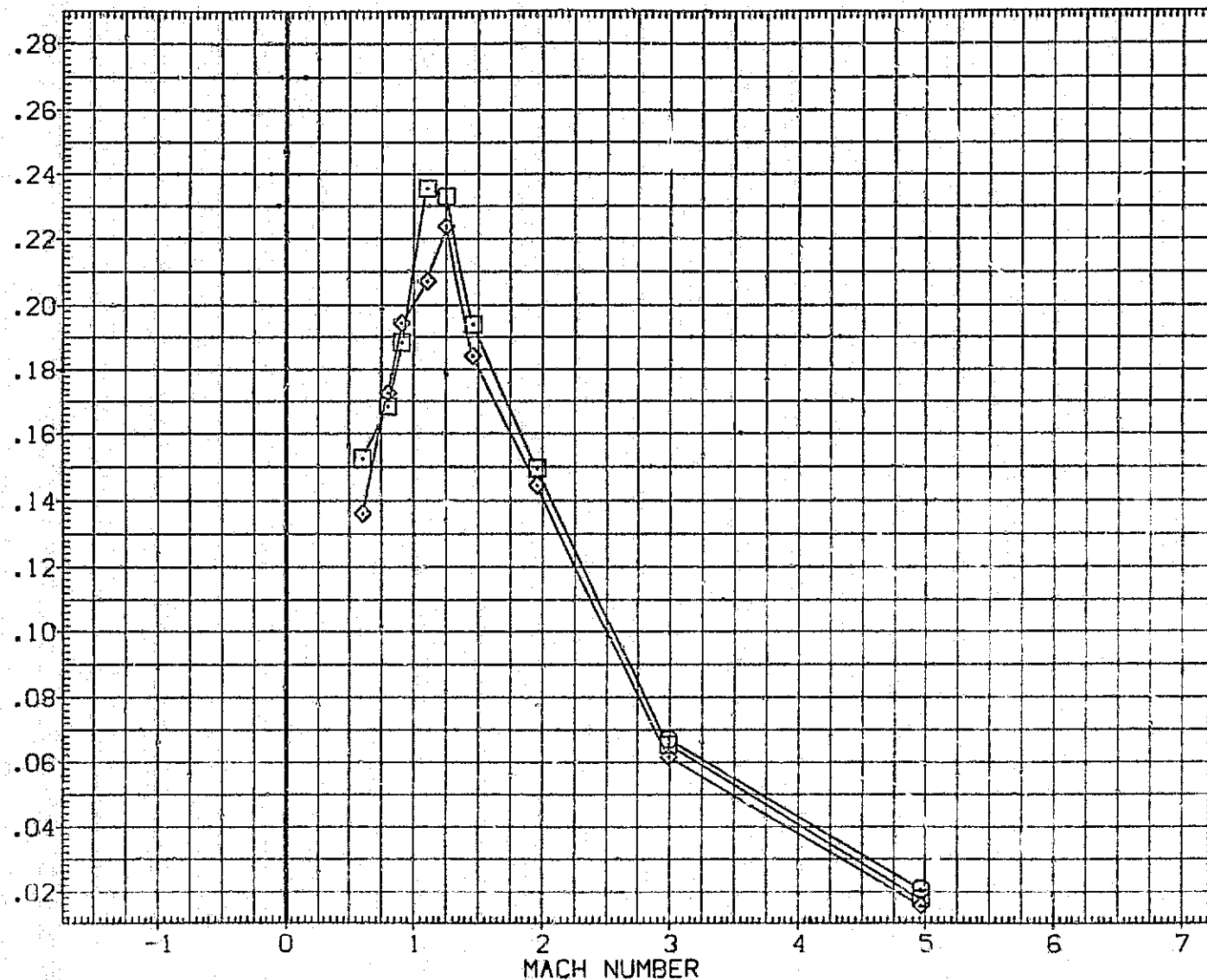


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(J) ALPHA = 8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(IA33) 740TS (T1PIS3P20IF2)	ORB STING
(VIC021)	MSFC 594(IA33) 740TS (T2PIS3P20IF2)	ORB STING
(VIC007)	MSFC 594(IA33) 740TS (T1PIS1P20I)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SUM OF THE ORB, ET AND SRB BASE AXIAL FORCE COEFFICIENTS, CABT

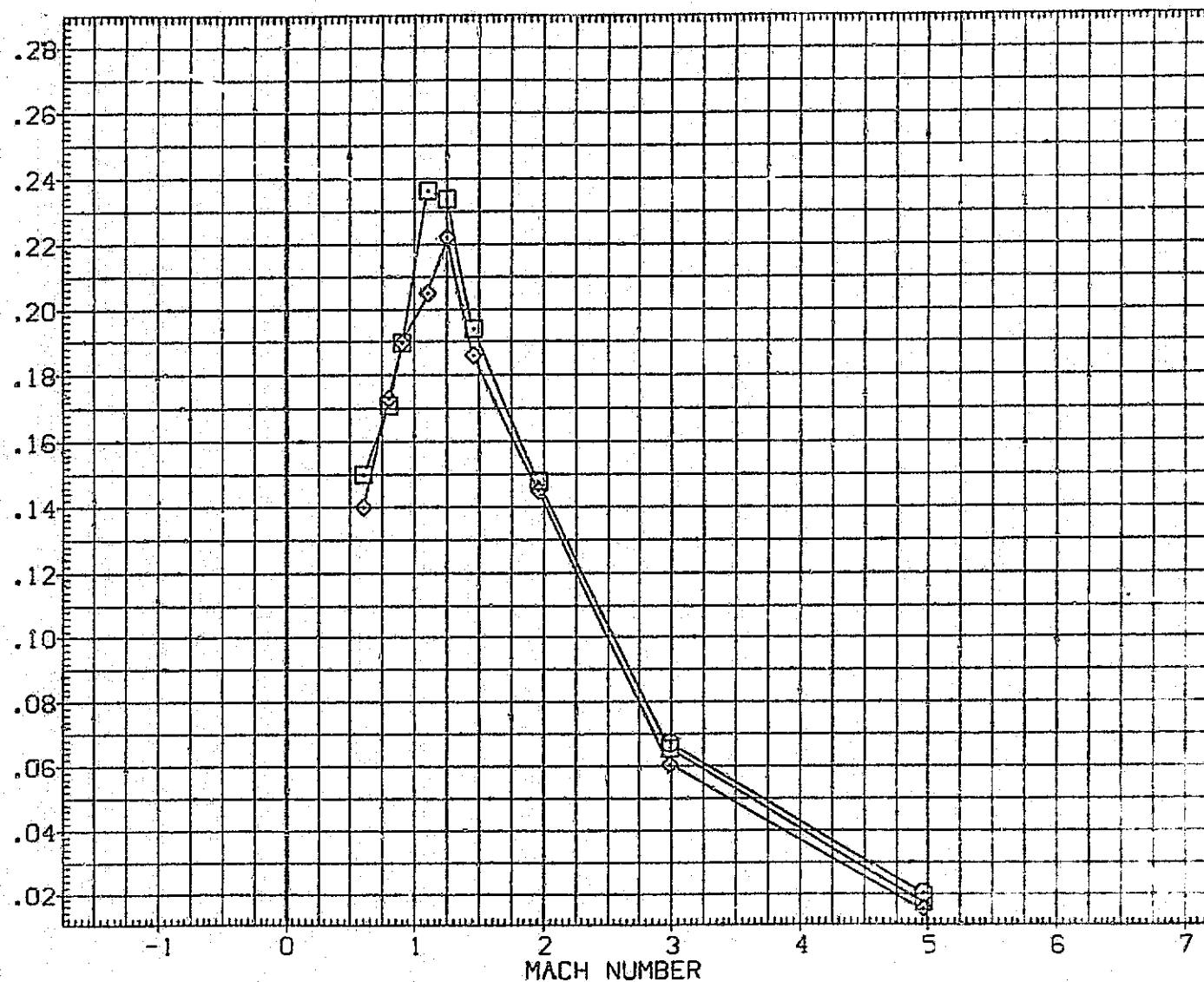


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(K) ALPHA = 10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035) ○	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021) □	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007) ◇	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

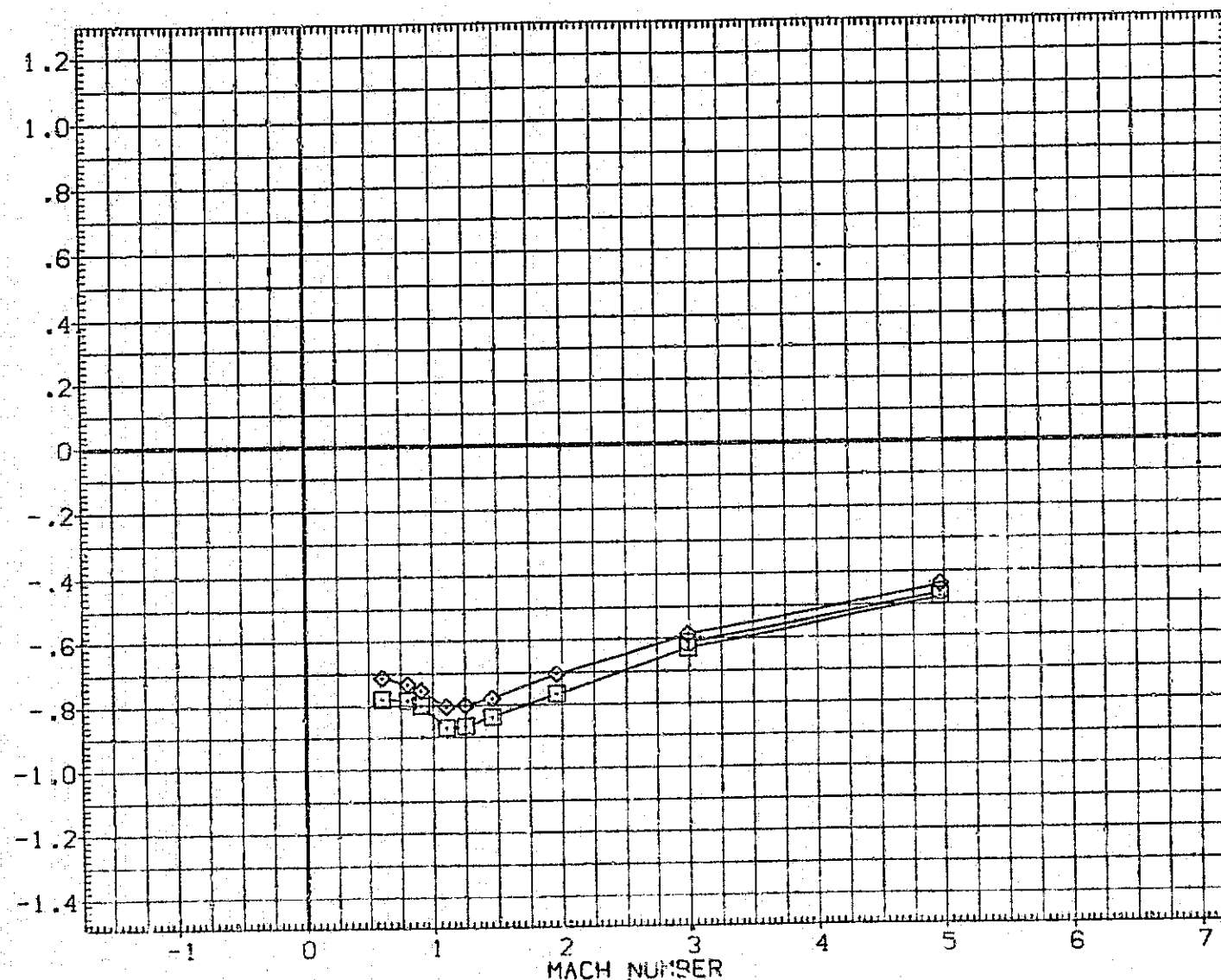


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(A) ALPHA = -10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P20IF2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P20IF2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P20I)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

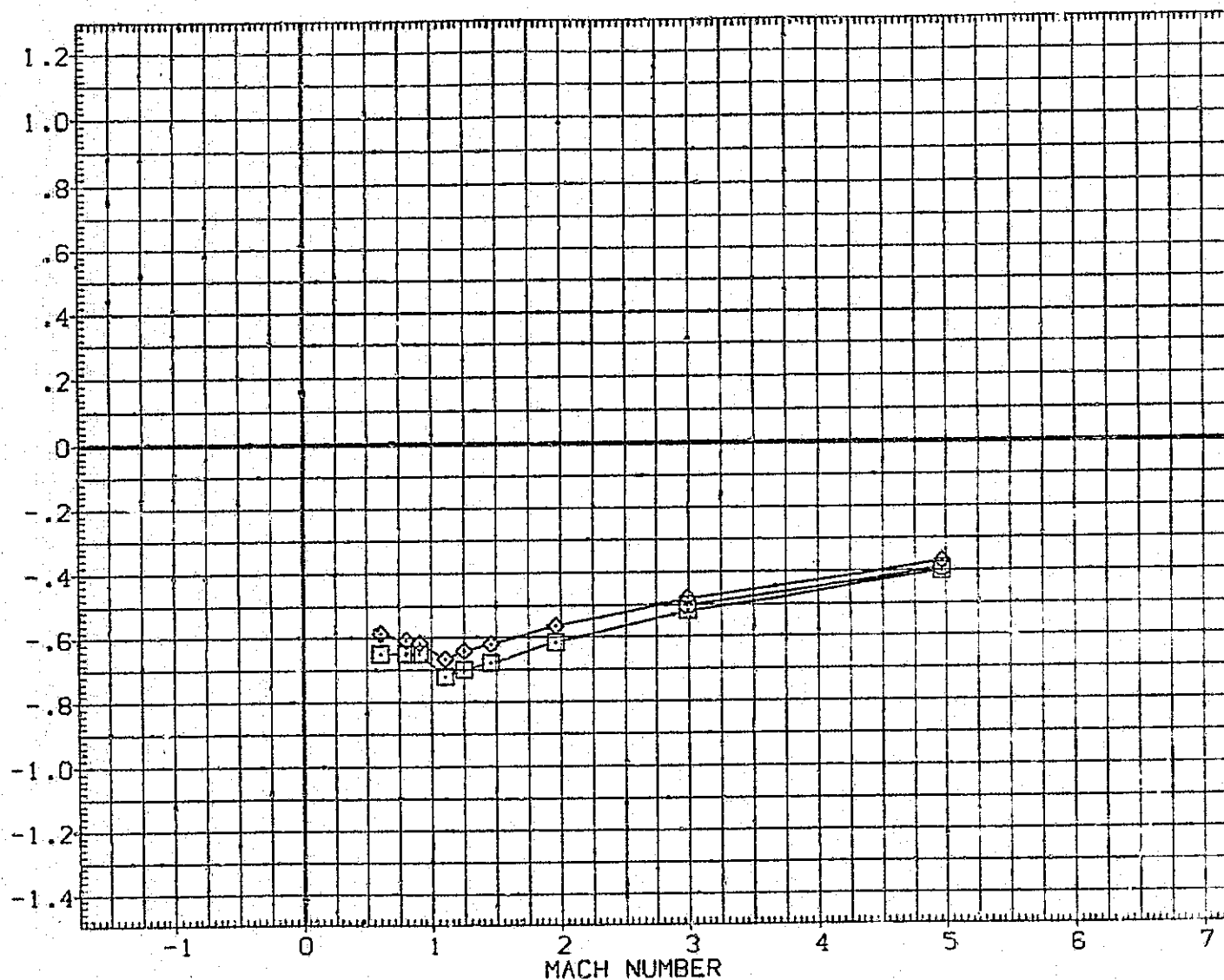


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LONGITUDINAL AERO

(B) ALPHA = -8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
AMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

NORMAL FORCE COEFFICIENT, CN

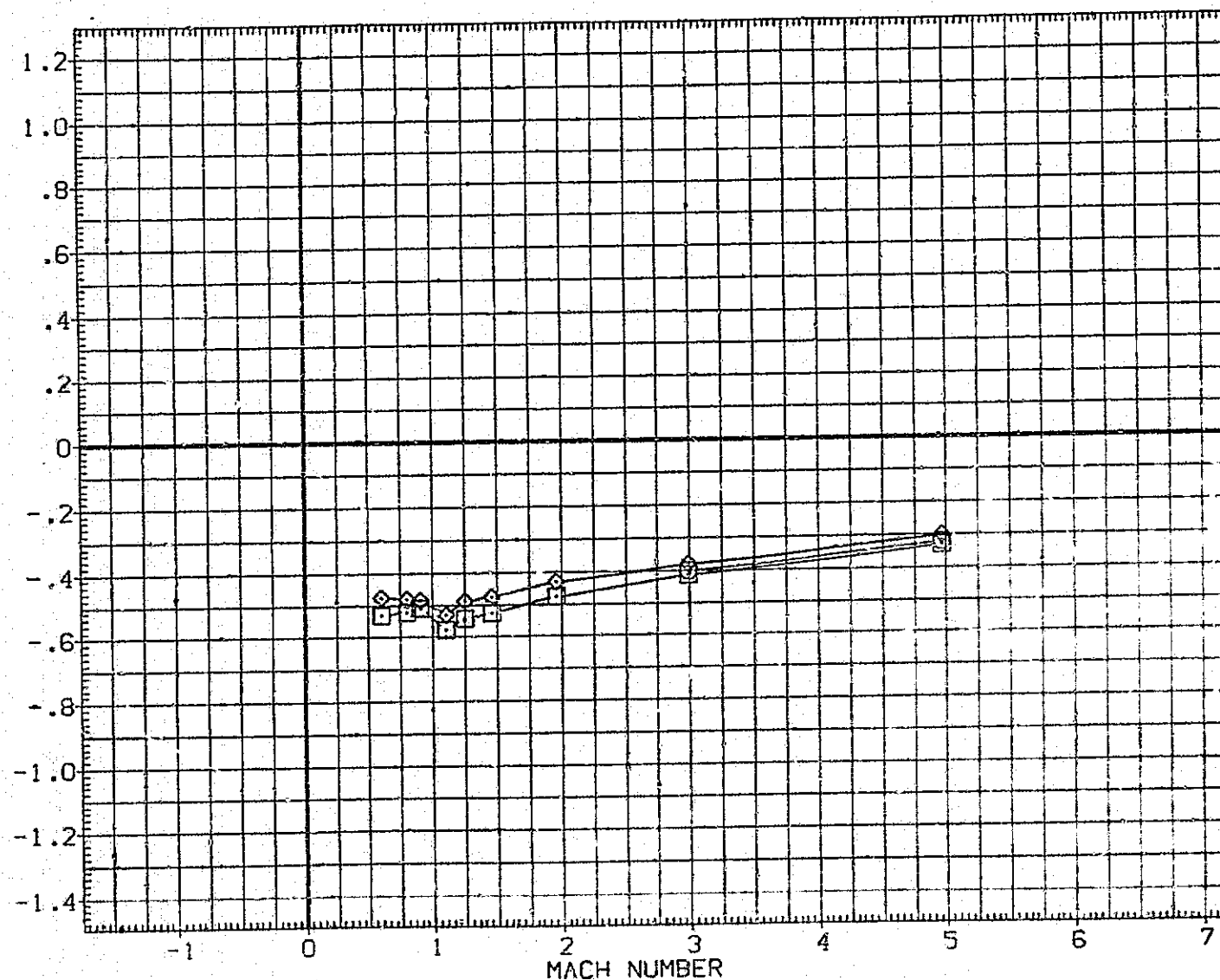


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(C) ALPHA = -6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	90.
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

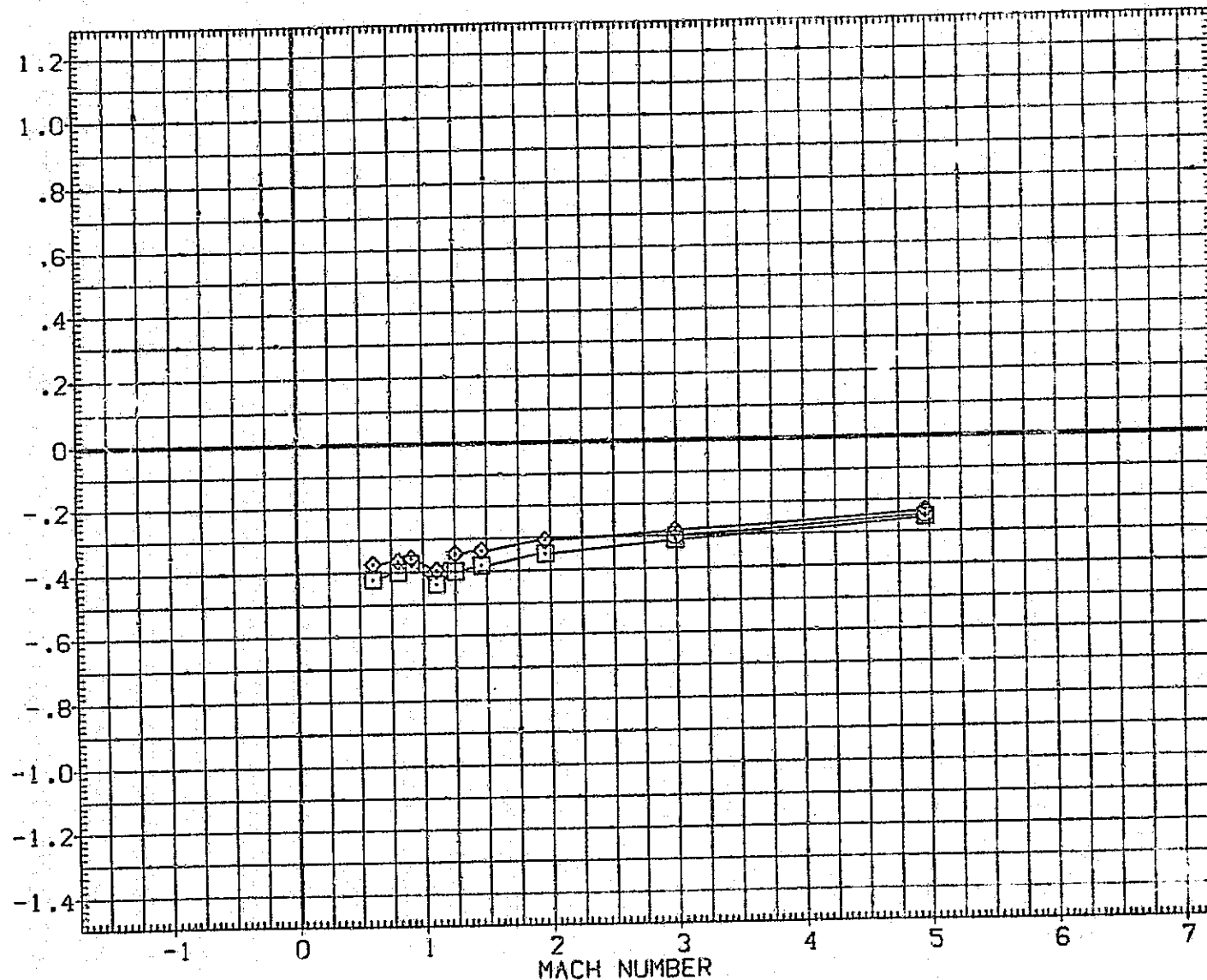


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(D)ALPHA = -4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

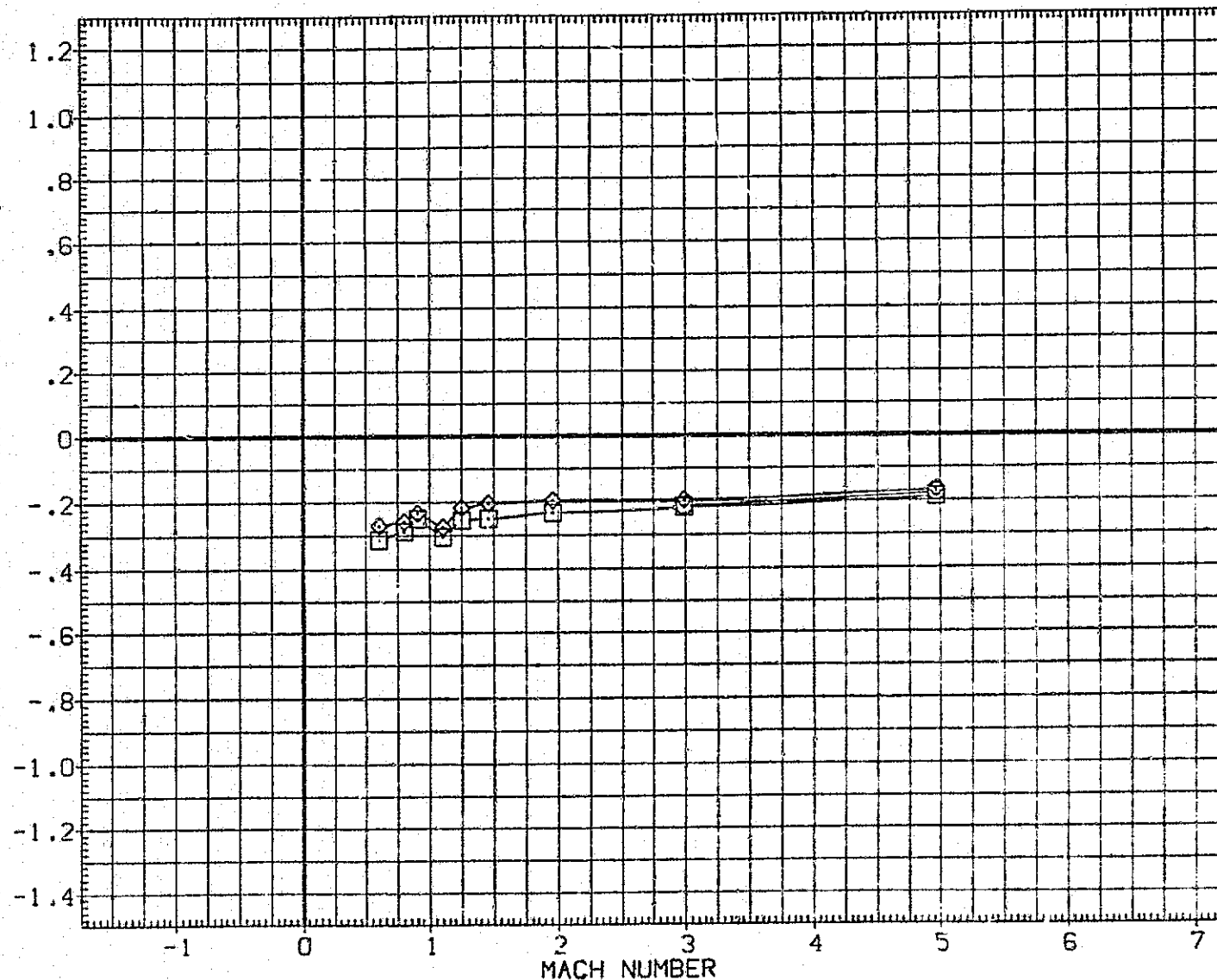


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(E) ALPHA = -2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

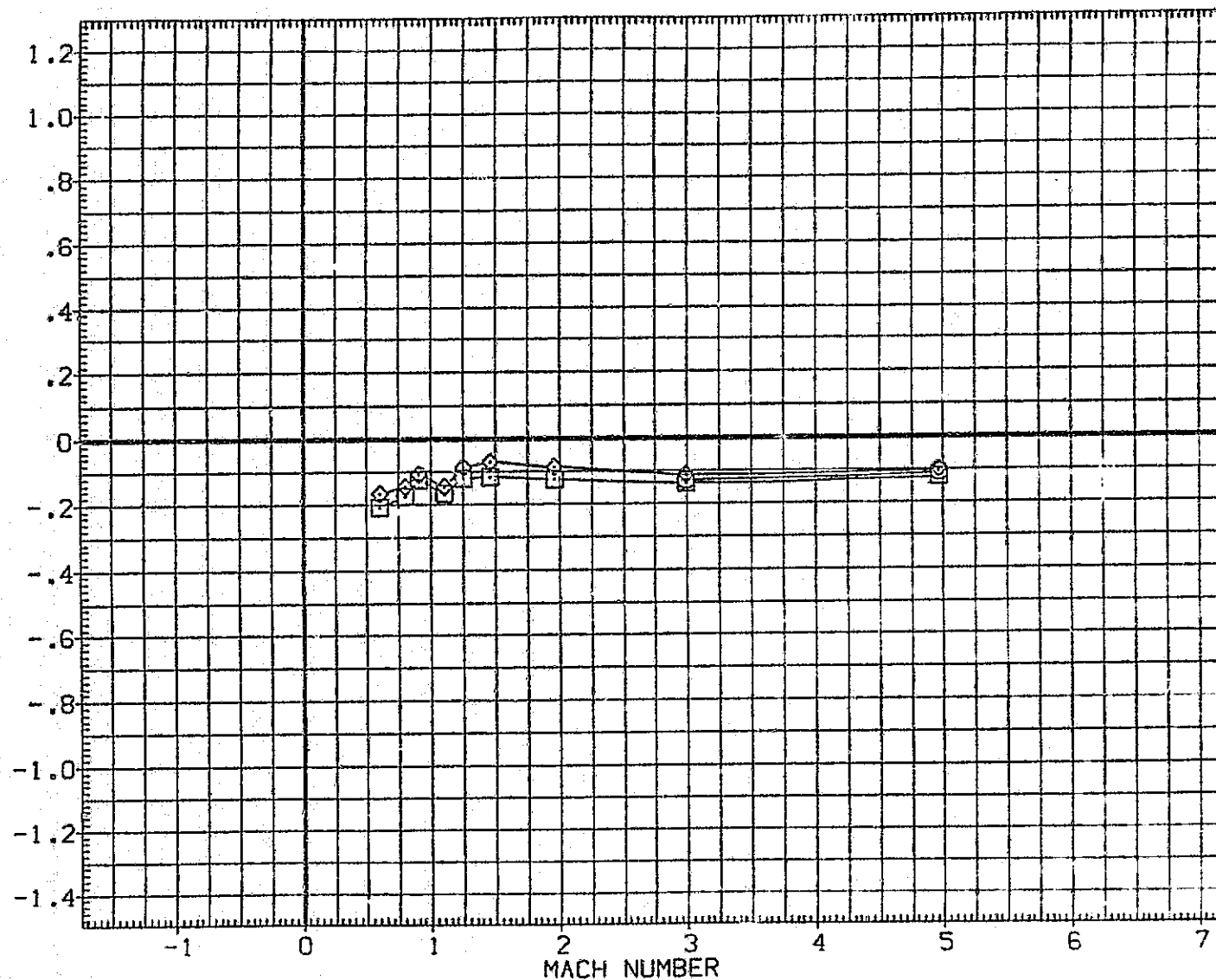


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(F) ALPHA = .00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	400.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

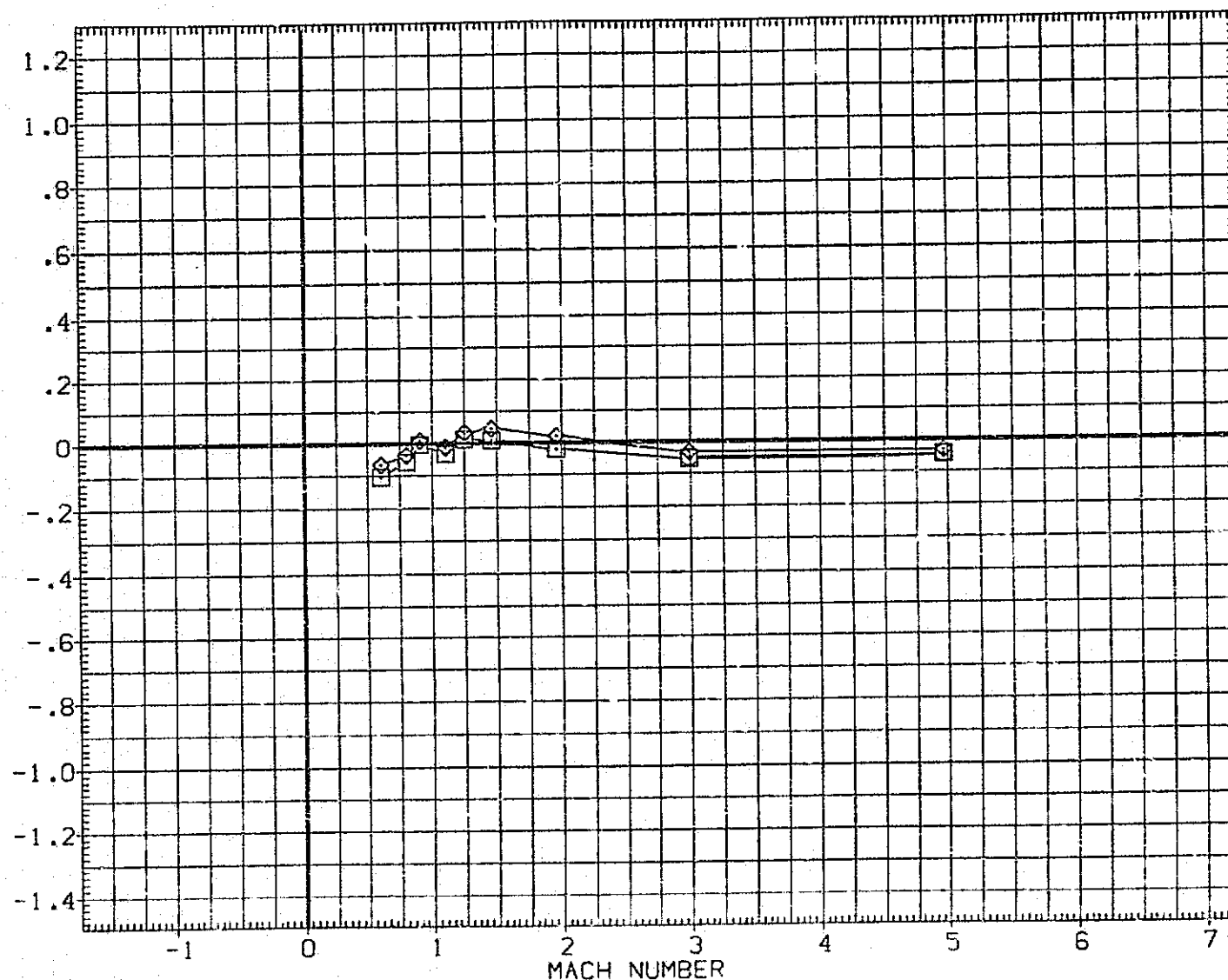


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(G)ALPHA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594 (A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594 (A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594 (A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

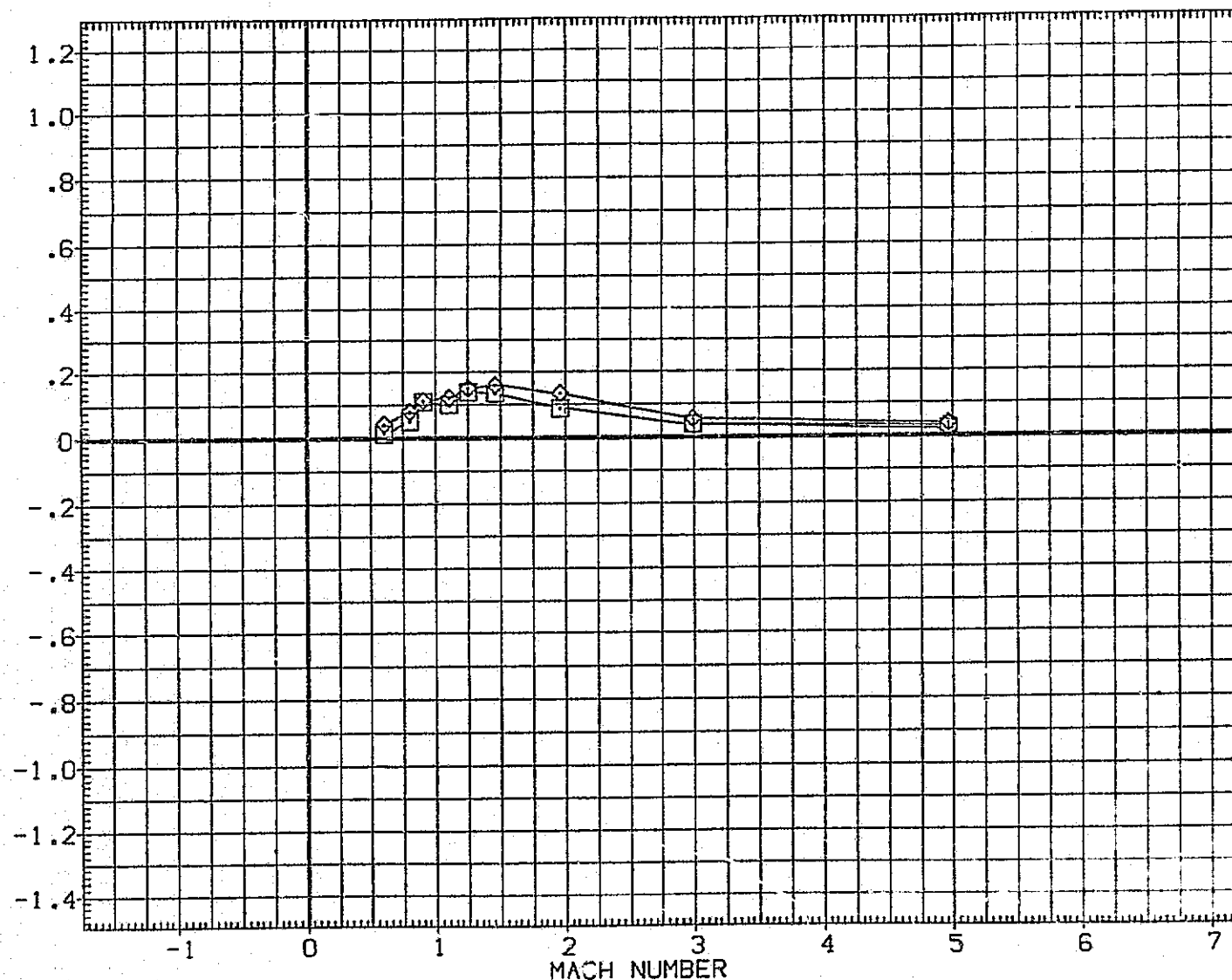


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(H)ALPHA = 4.00

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (TIPIS3P20IF2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2PIS3P20IF2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (TIPIS1P20I)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

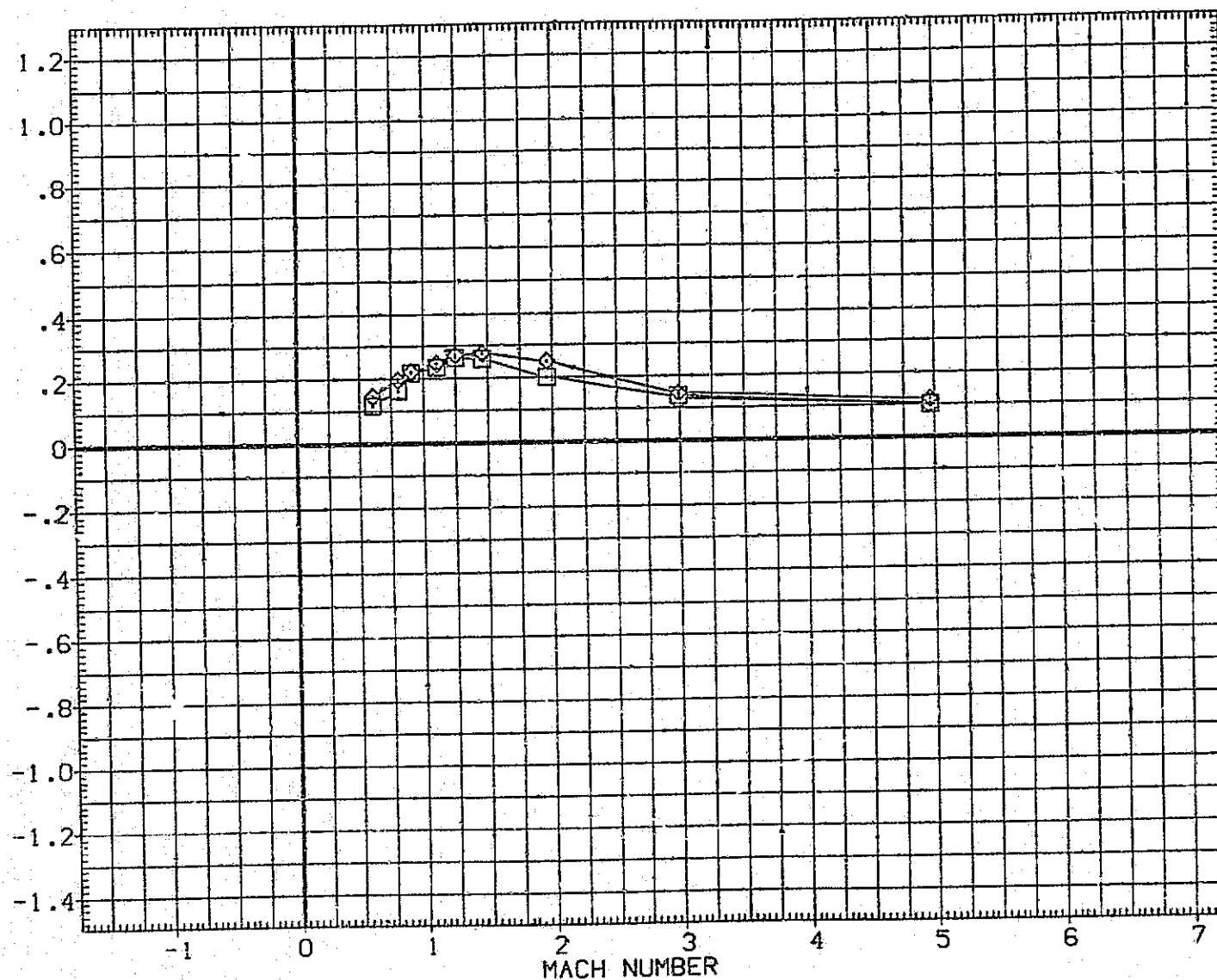


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(I) ALPHA = 6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2590.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

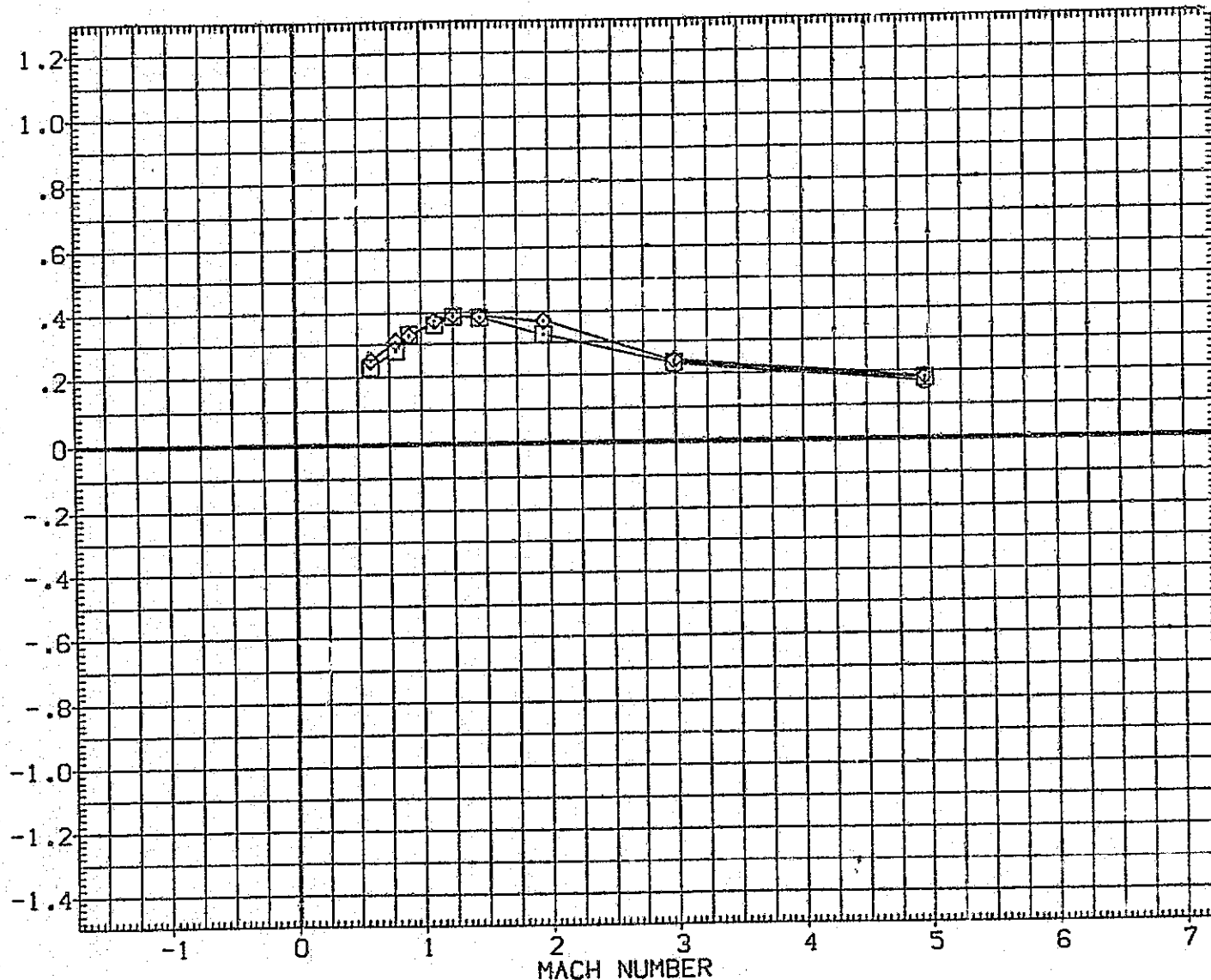


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(J)ALPHA = 8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (12P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

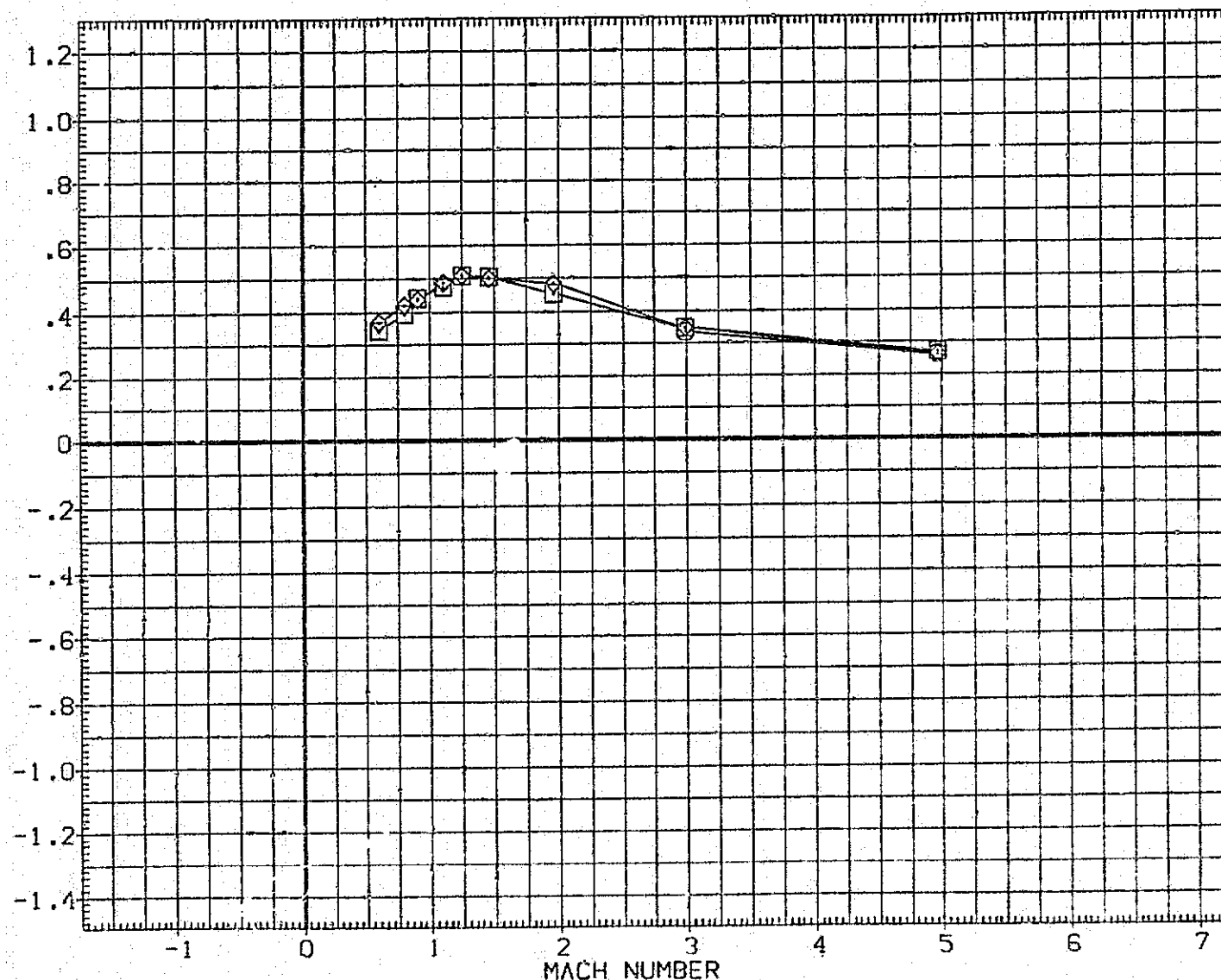


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(K) ALPHA = 10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (TIP1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

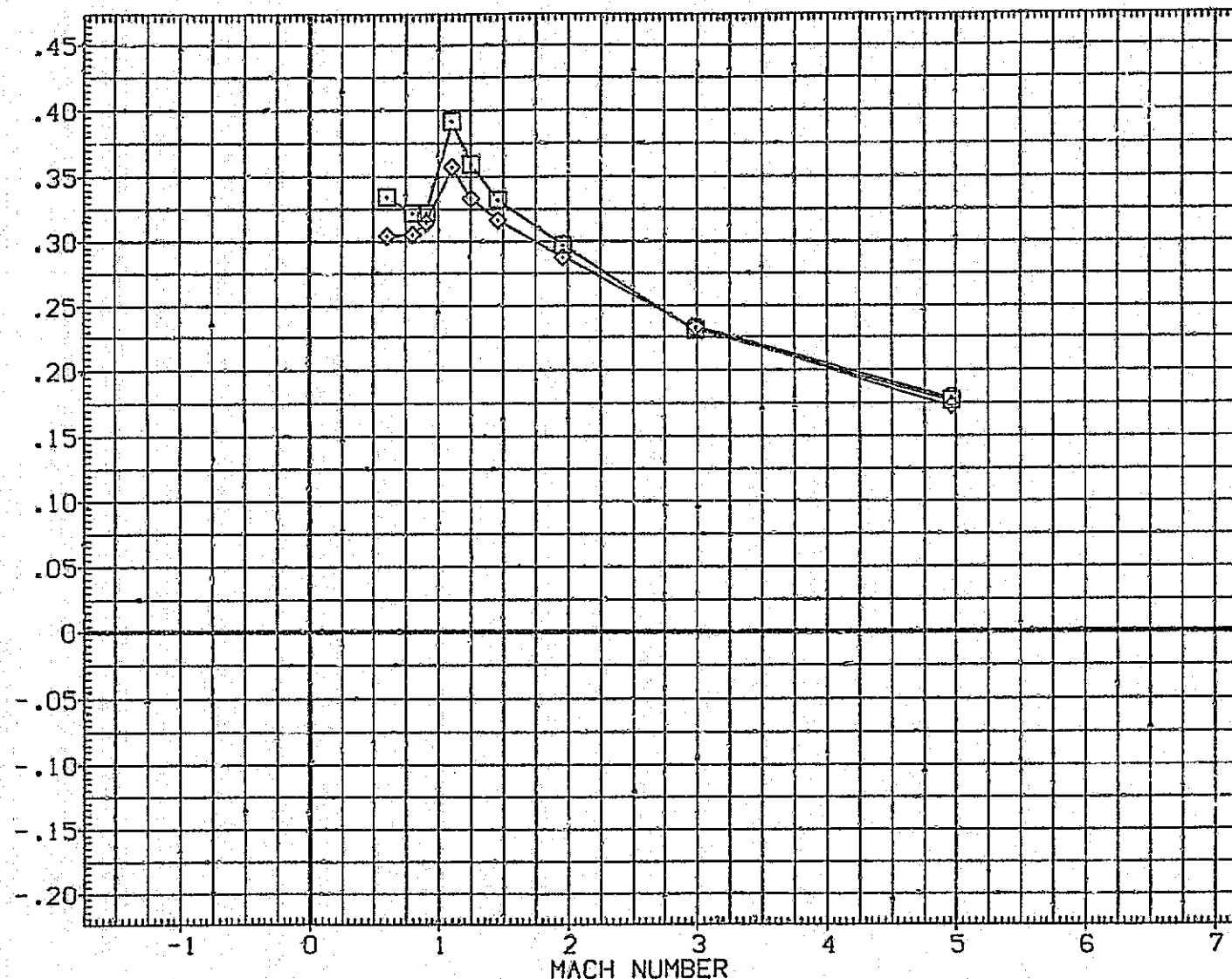


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(A) ALPHA = -10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594 (A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594 (A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594 (A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

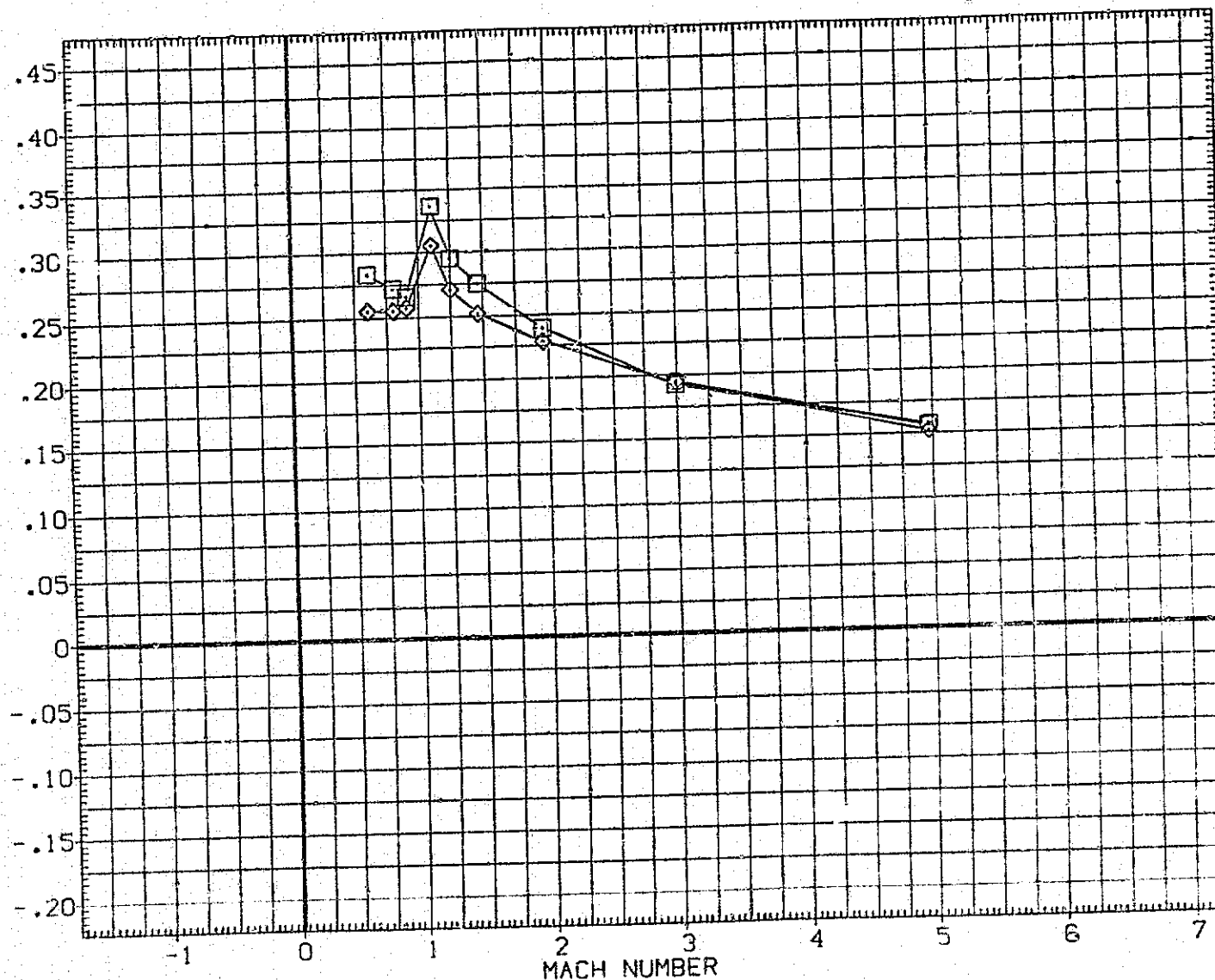


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(B) ALPHA = -8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC S94(1A33) 740TS (TIPIS3P201F2)	ORB STING
(VIC021)	MSFC S94(1A33) 740TS (T2PIS3P201F2)	ORB STING
(VIC007)	MSFC S94(1A33) 740TS (TIPIS1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

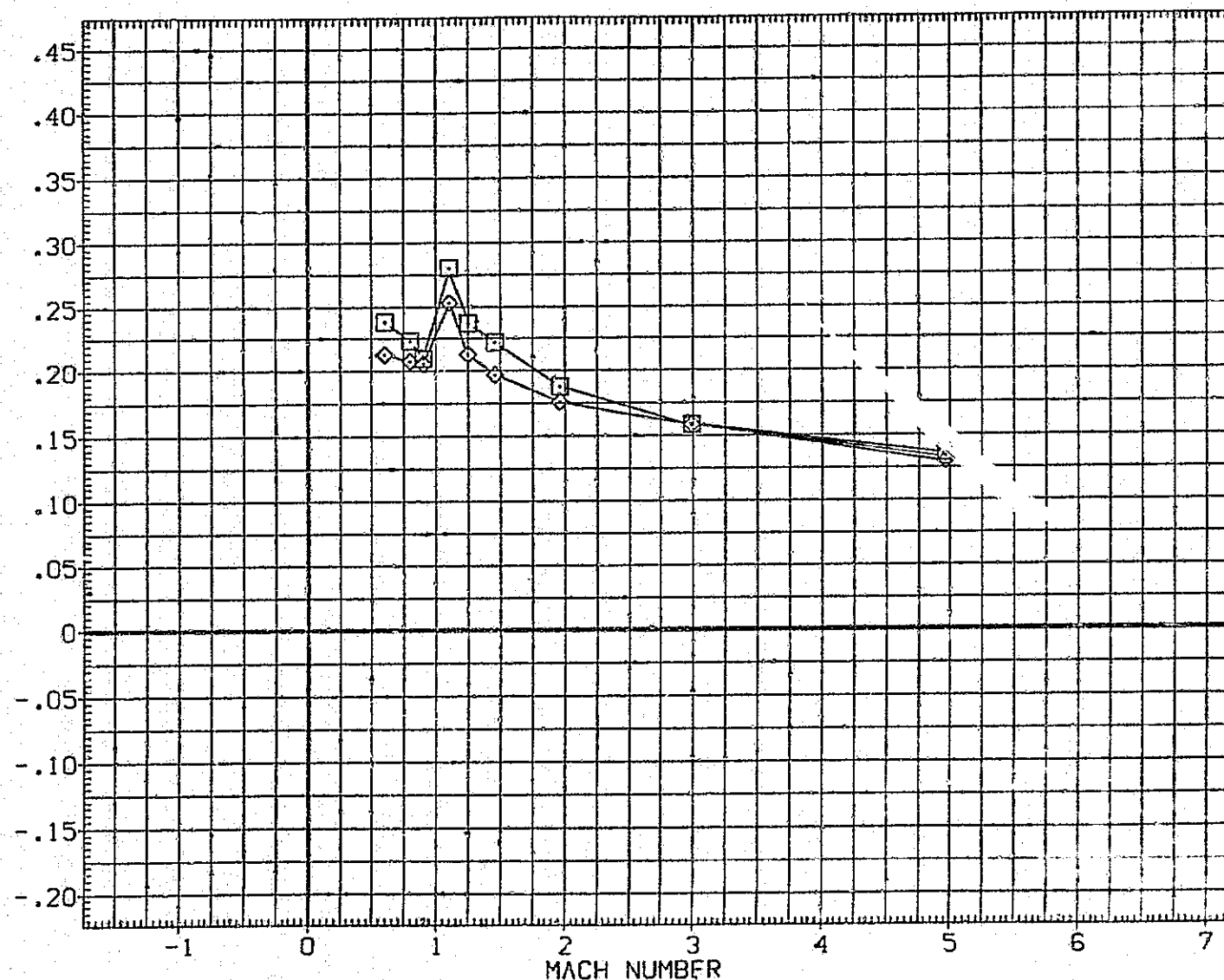


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LONGITUDINAL AERO
(C) ALPHA = -6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

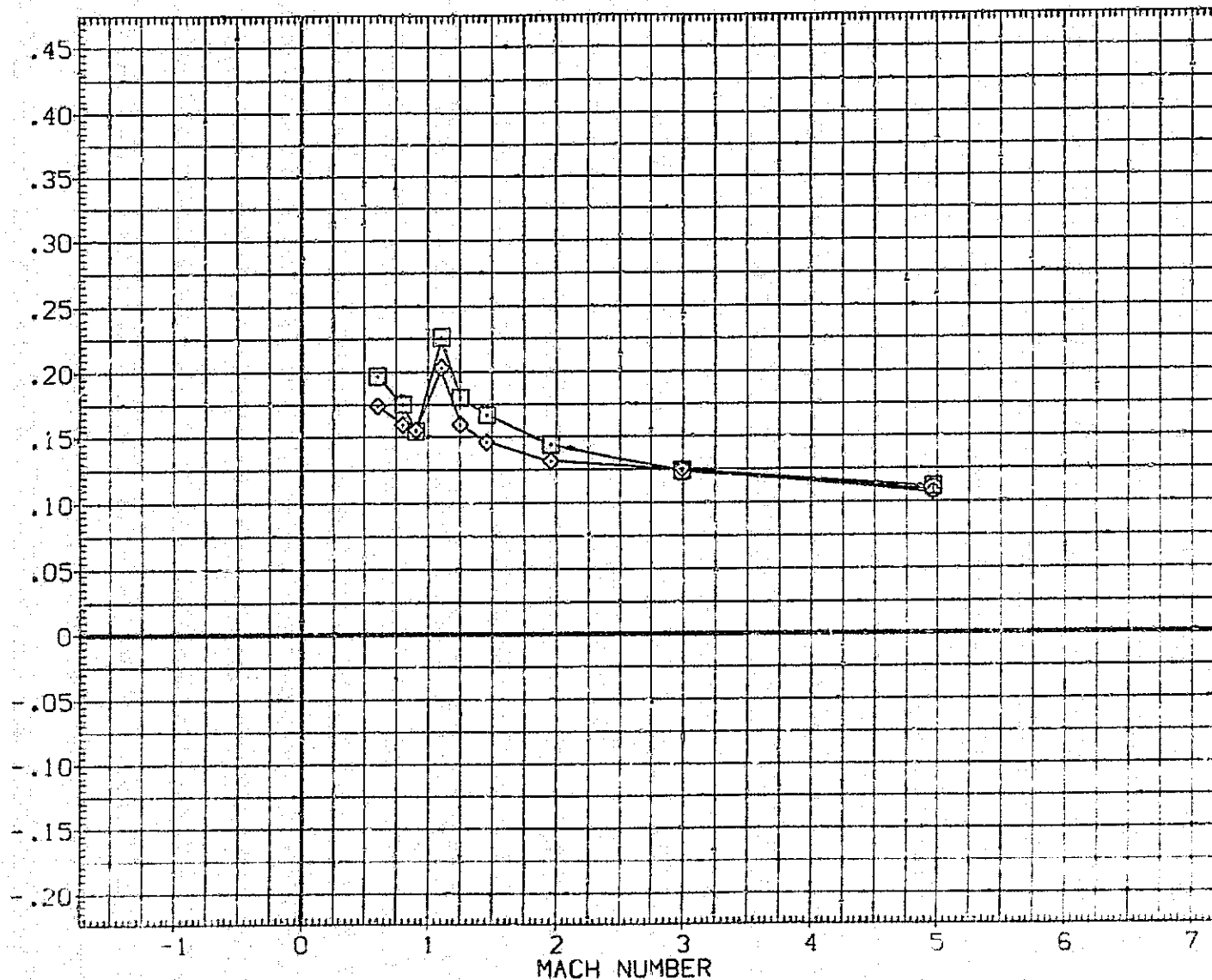


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(D) ALPHA -4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
VMRP	976.0000	IN. XT
VMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

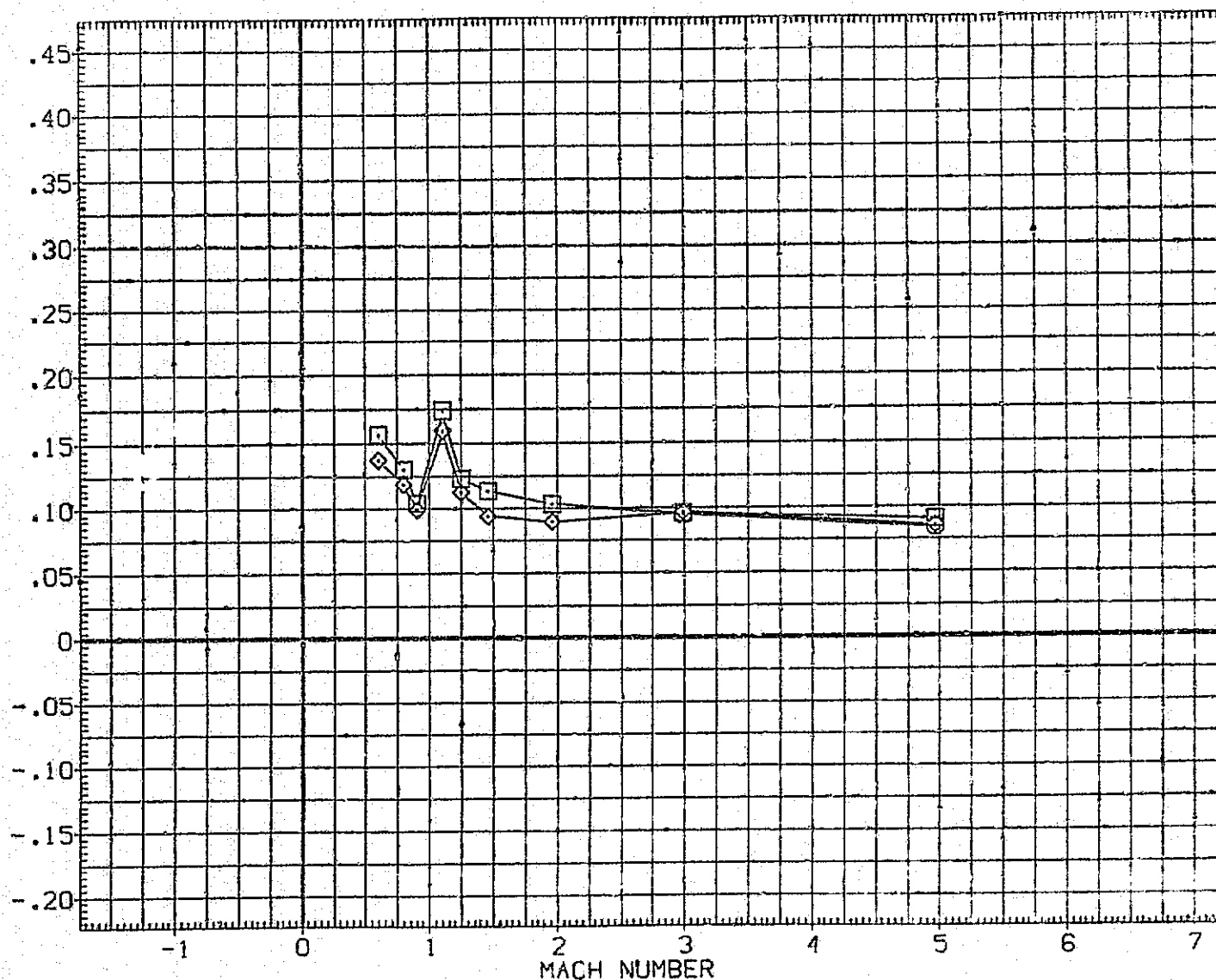


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(E) ALPHA = -2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(A33) 740TS (TIP1S3P201F2)	ORB STING
(VIC021)	MSFC 594(A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(A33) 740TS (TIP1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SD. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

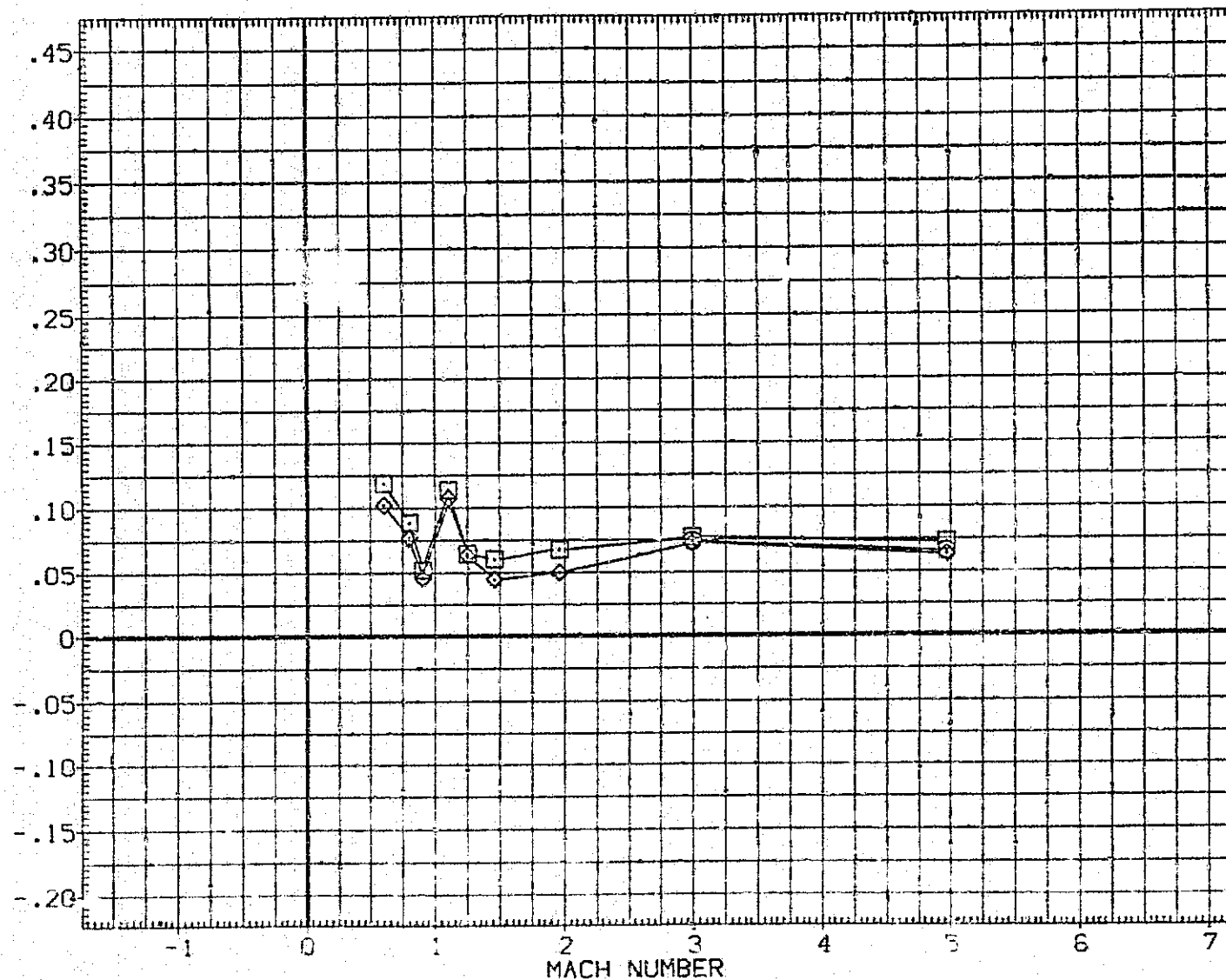


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LONGITUDINAL AERO
(F) ALPHA = .00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
[VIC035]	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
[VIC021]	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
[VIC007]	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

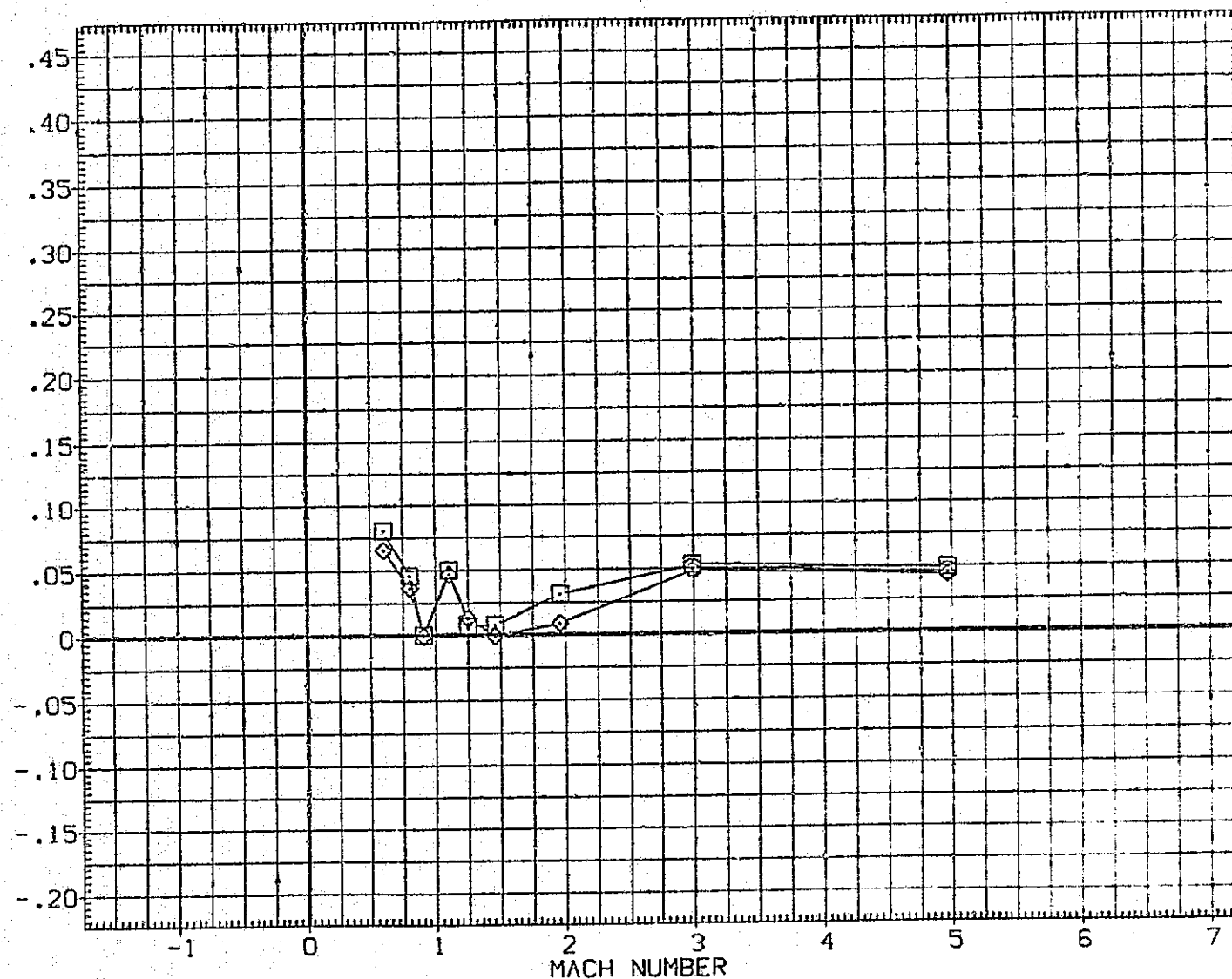


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LONGITUDINAL AERO
(G) ALPHA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594 (IA33) 740TS (TIPIS3P20IF2)	ORB STING
(VIC021)	MSFC 534 (IA33) 740TS (T2PIS3P20IF2)	ORB STING
(VIC007)	MSFC 594 (IA33) 740TS (TIPIS1P20I)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. YT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

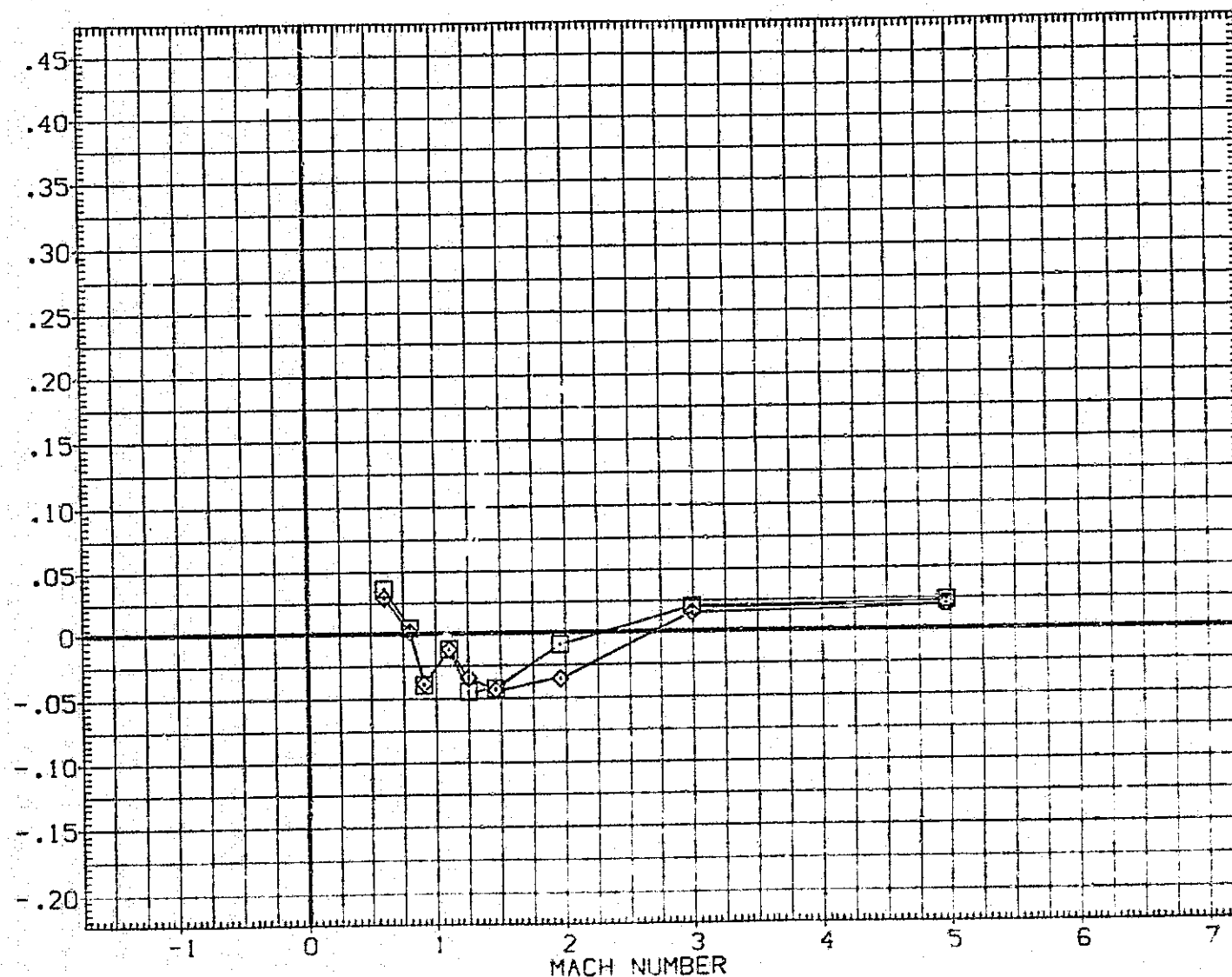


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(H) ALPHA = 4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1PIS3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1PIS1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

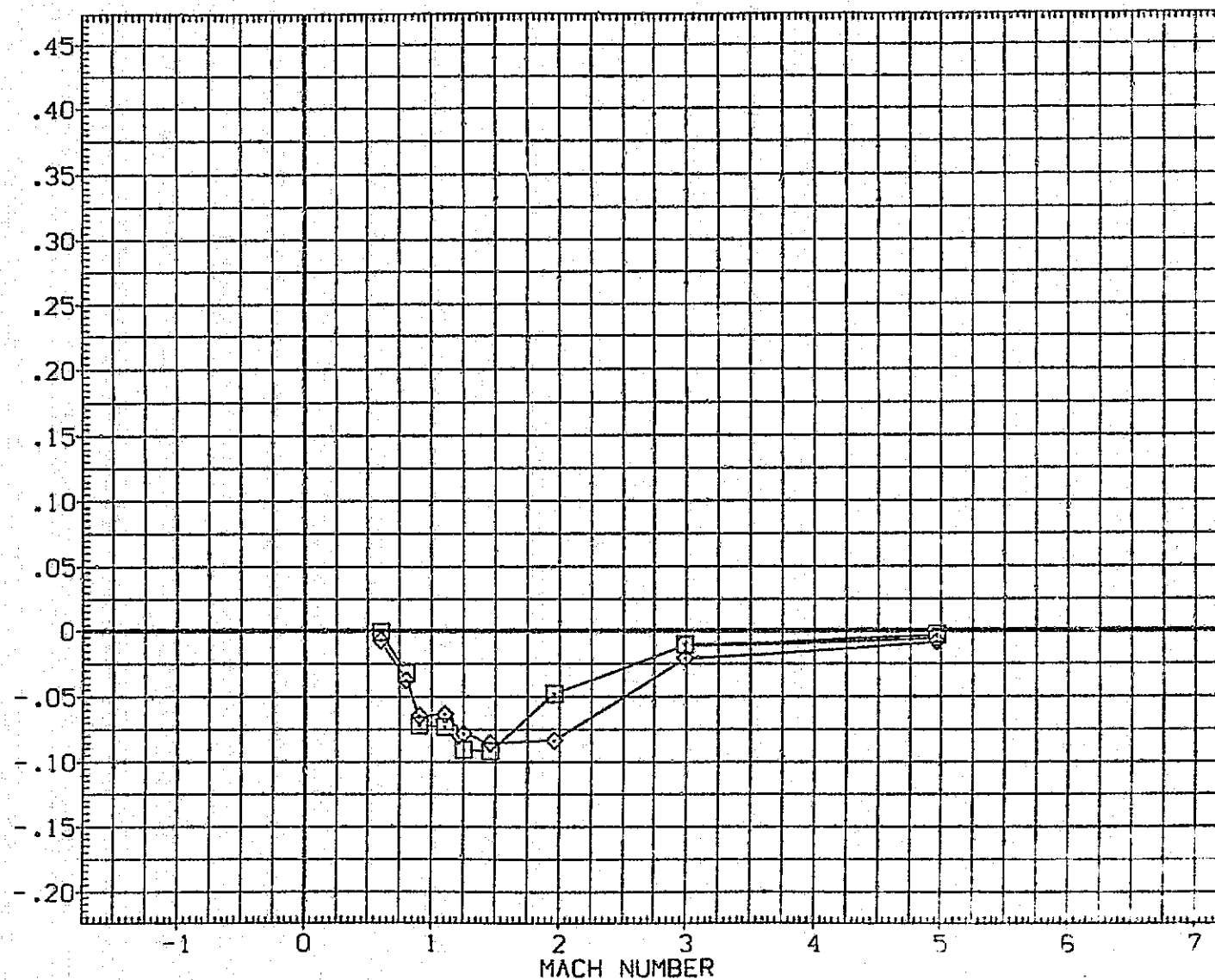


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO

(1) ALPHA = 6.00

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

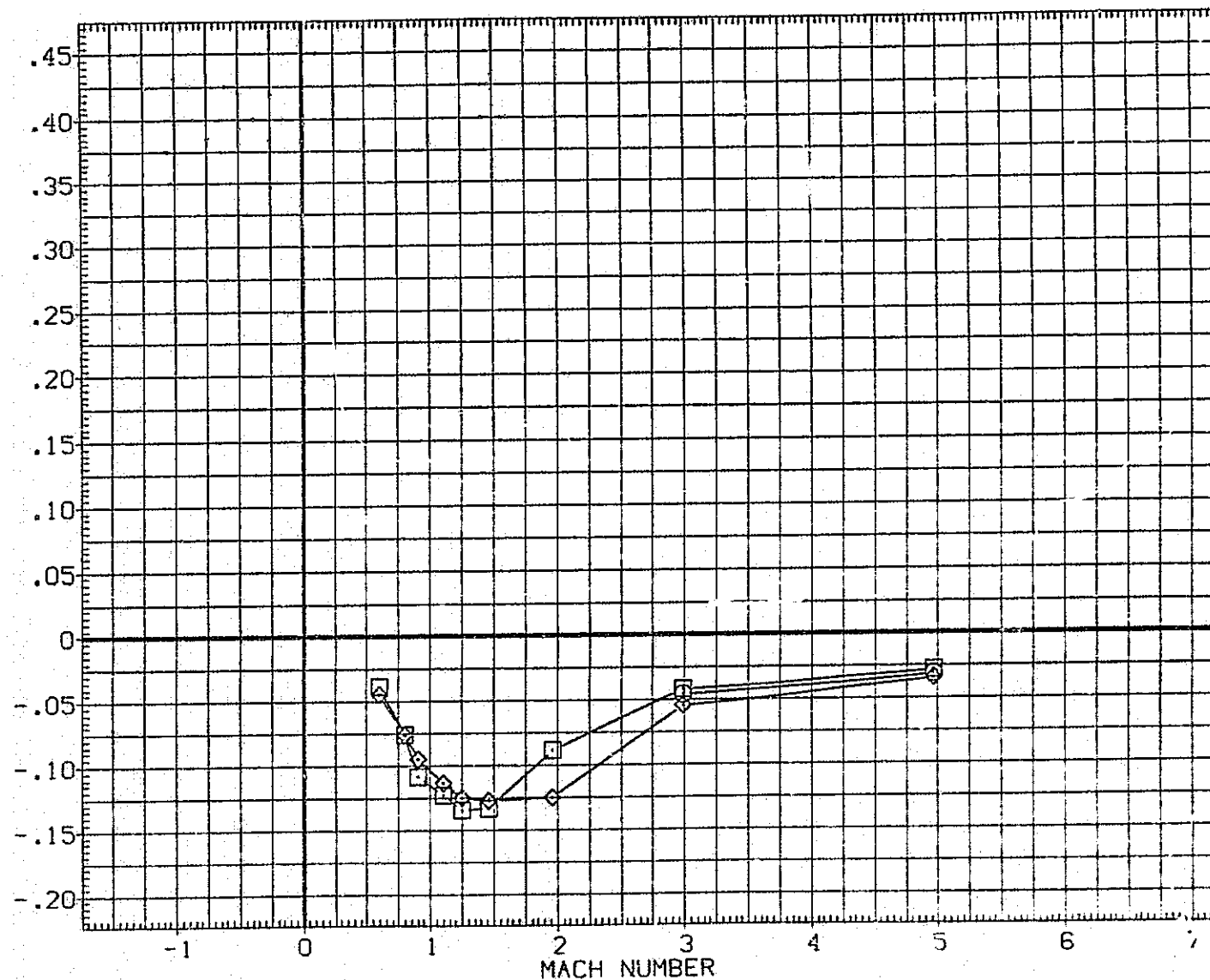


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(J) ALPHA = 8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC035)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC021)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING
(VIC007)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

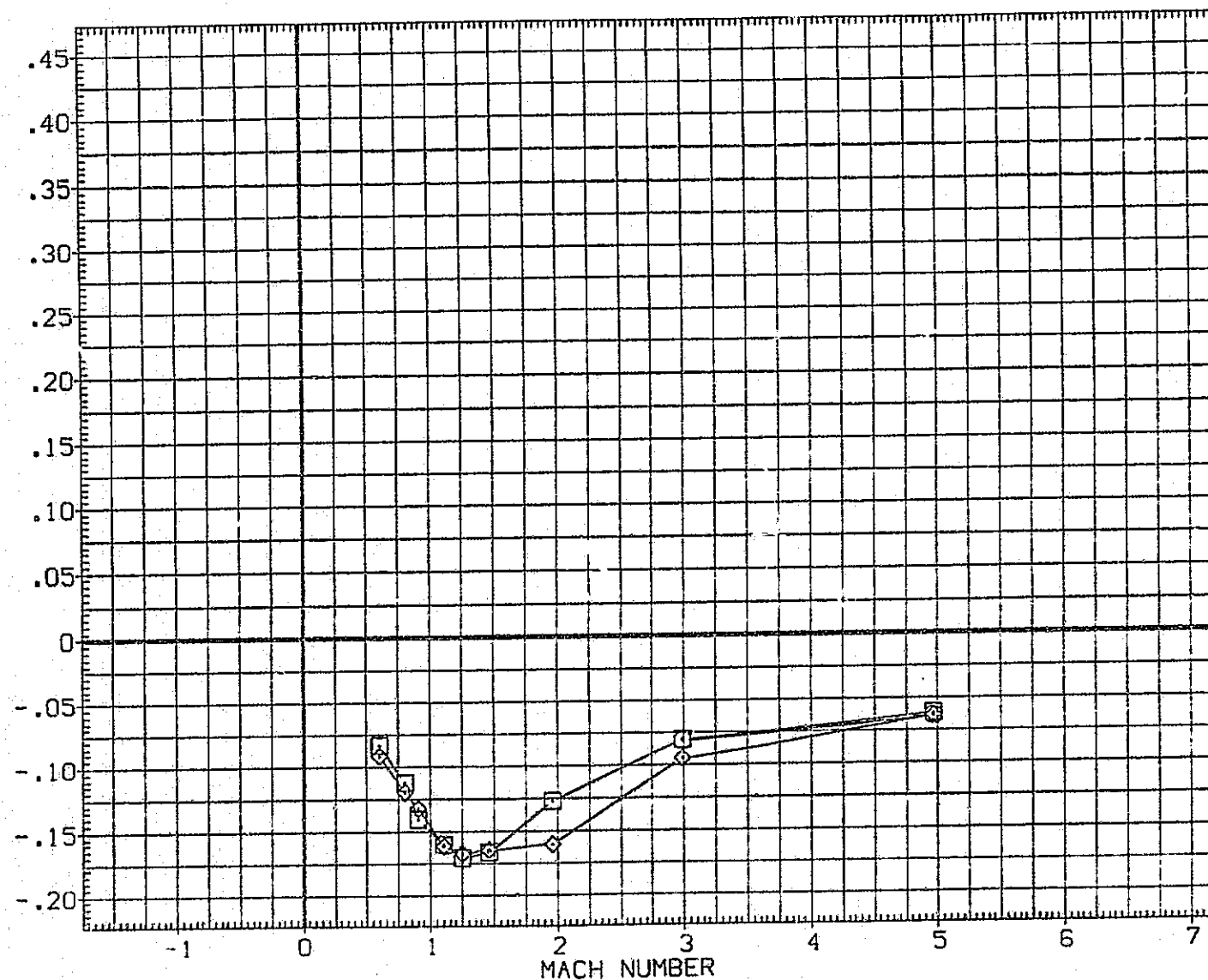


FIG10 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LONGITUDINAL AERO
(K)ALPHA = 10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(A1C008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(A1C036)	DATA NOT AVAILABLE	
(A1C022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XM RP	976.0000	IN. XT
YM RP	.0000	IN. YT
ZM RP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

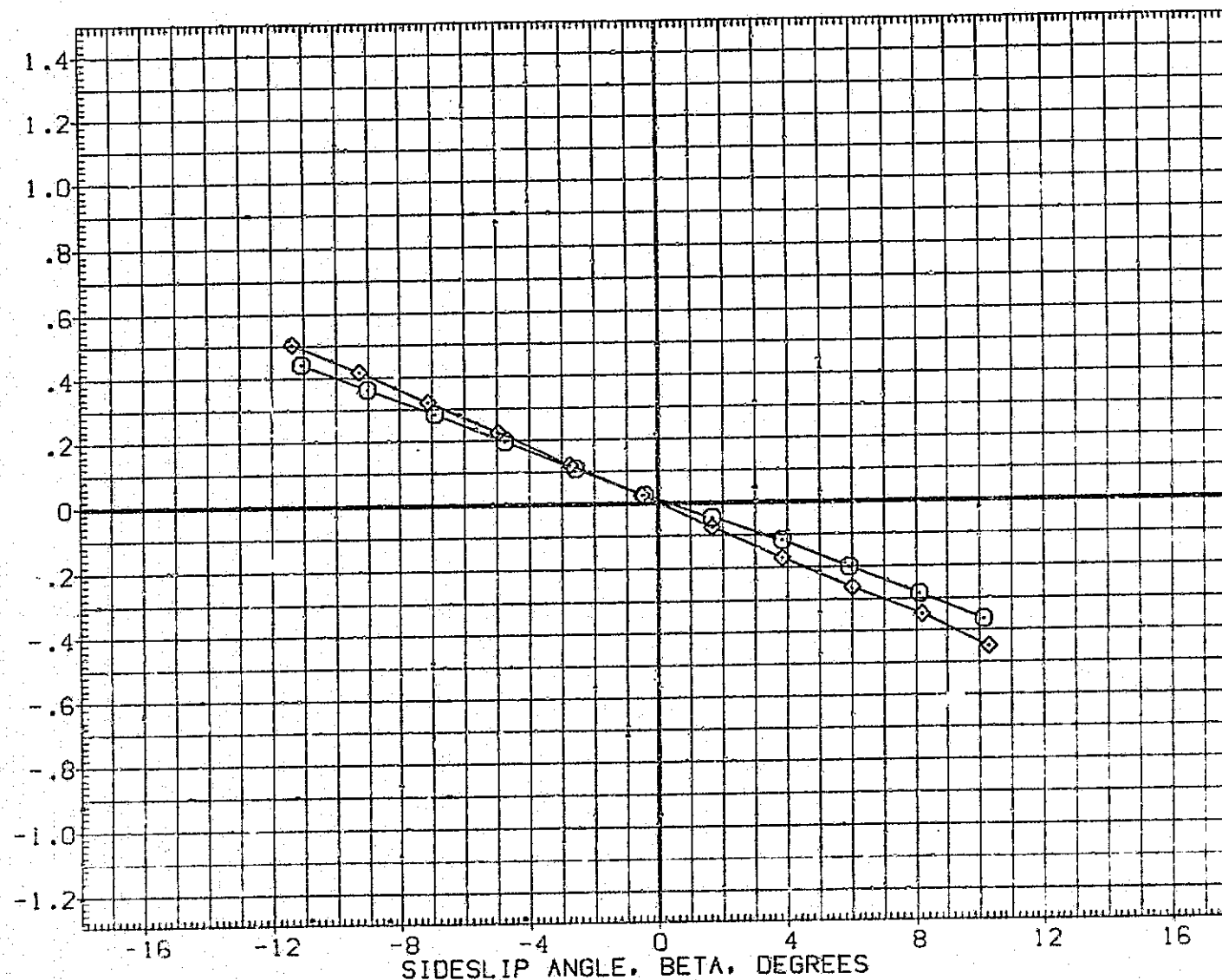


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LATERAL/DIRECTIONAL AERO

CA MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

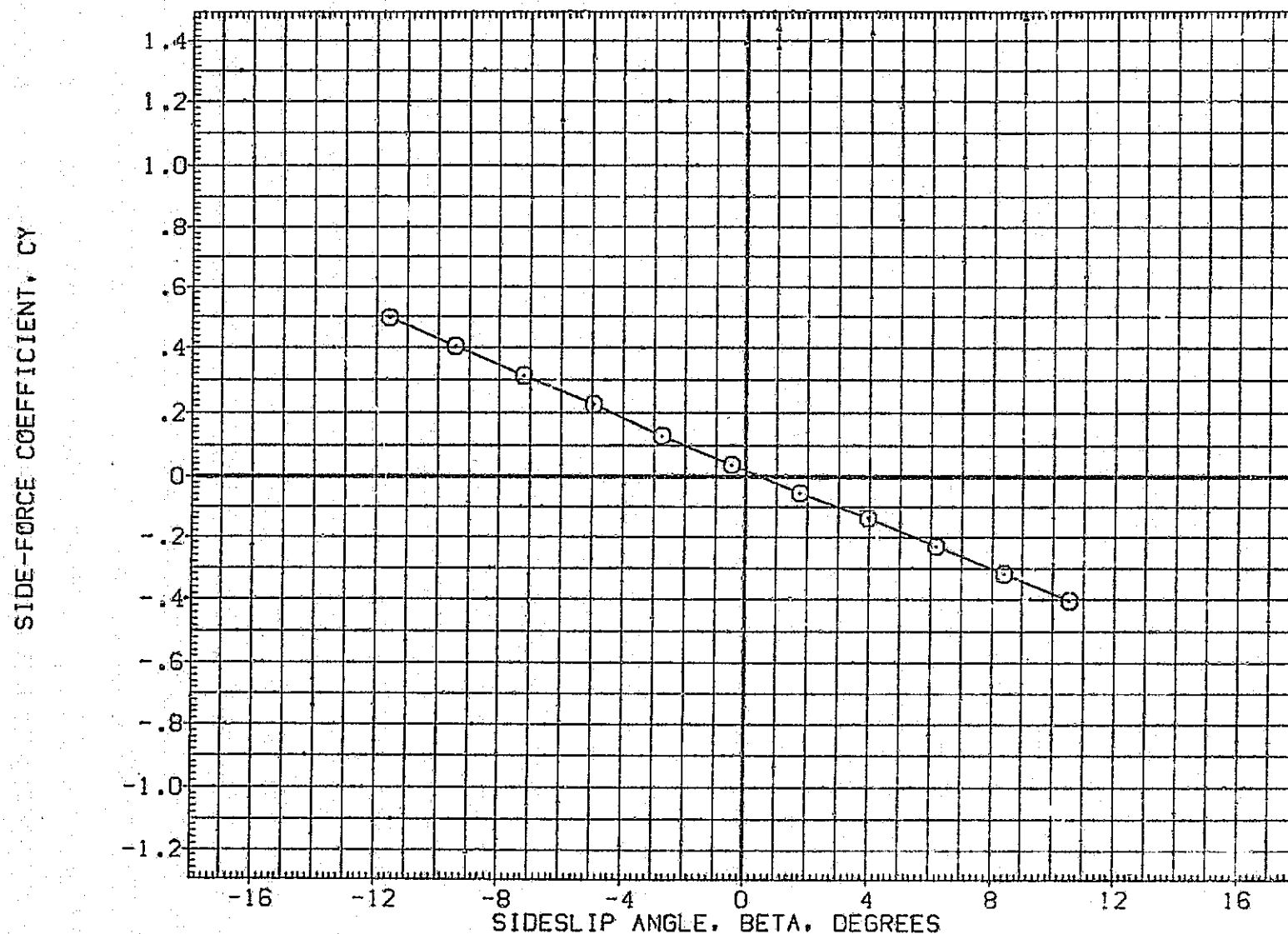


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
DREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

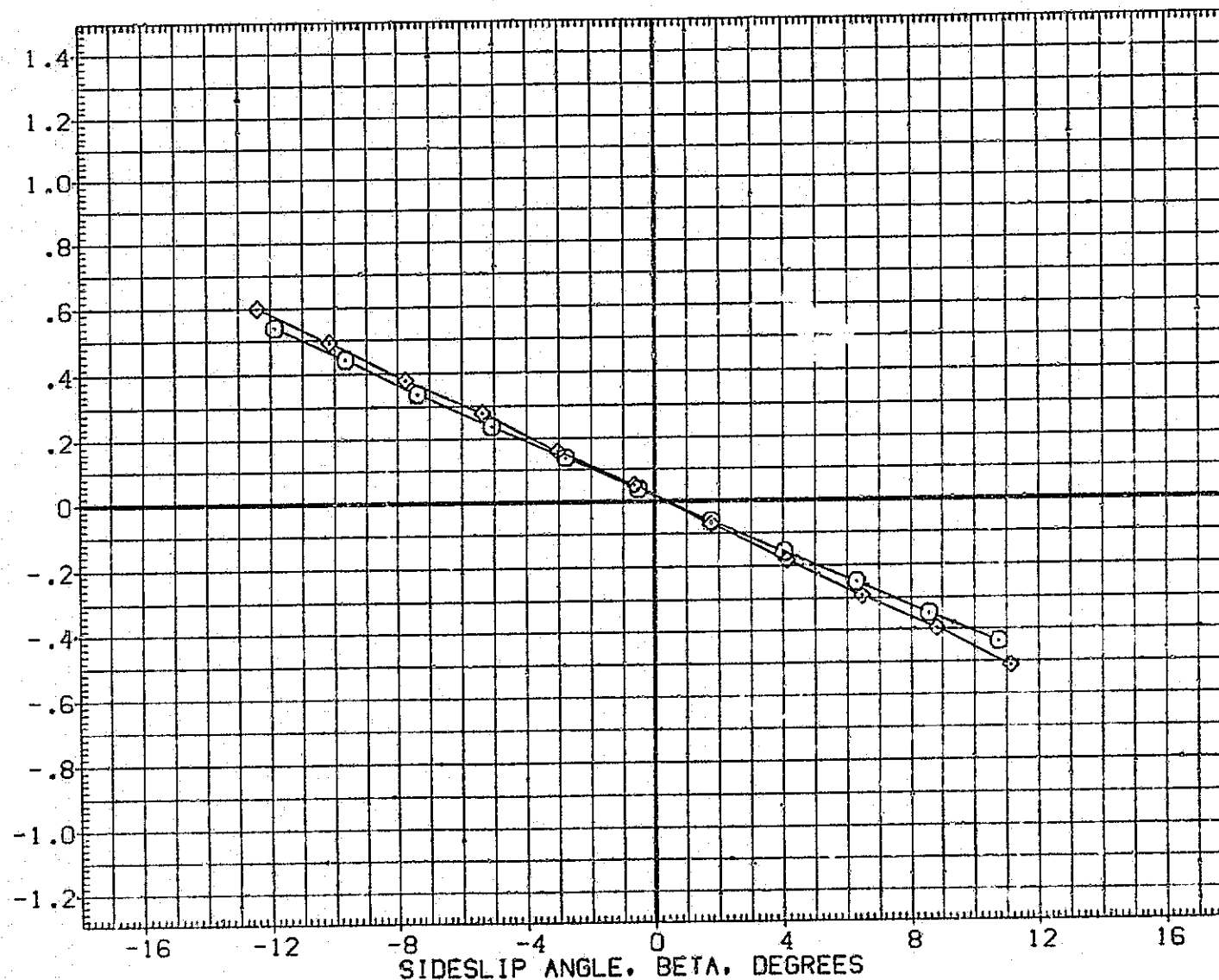


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(A1C008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(A1C036)	DATA NOT AVAILABLE	
(A1C022)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1250.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

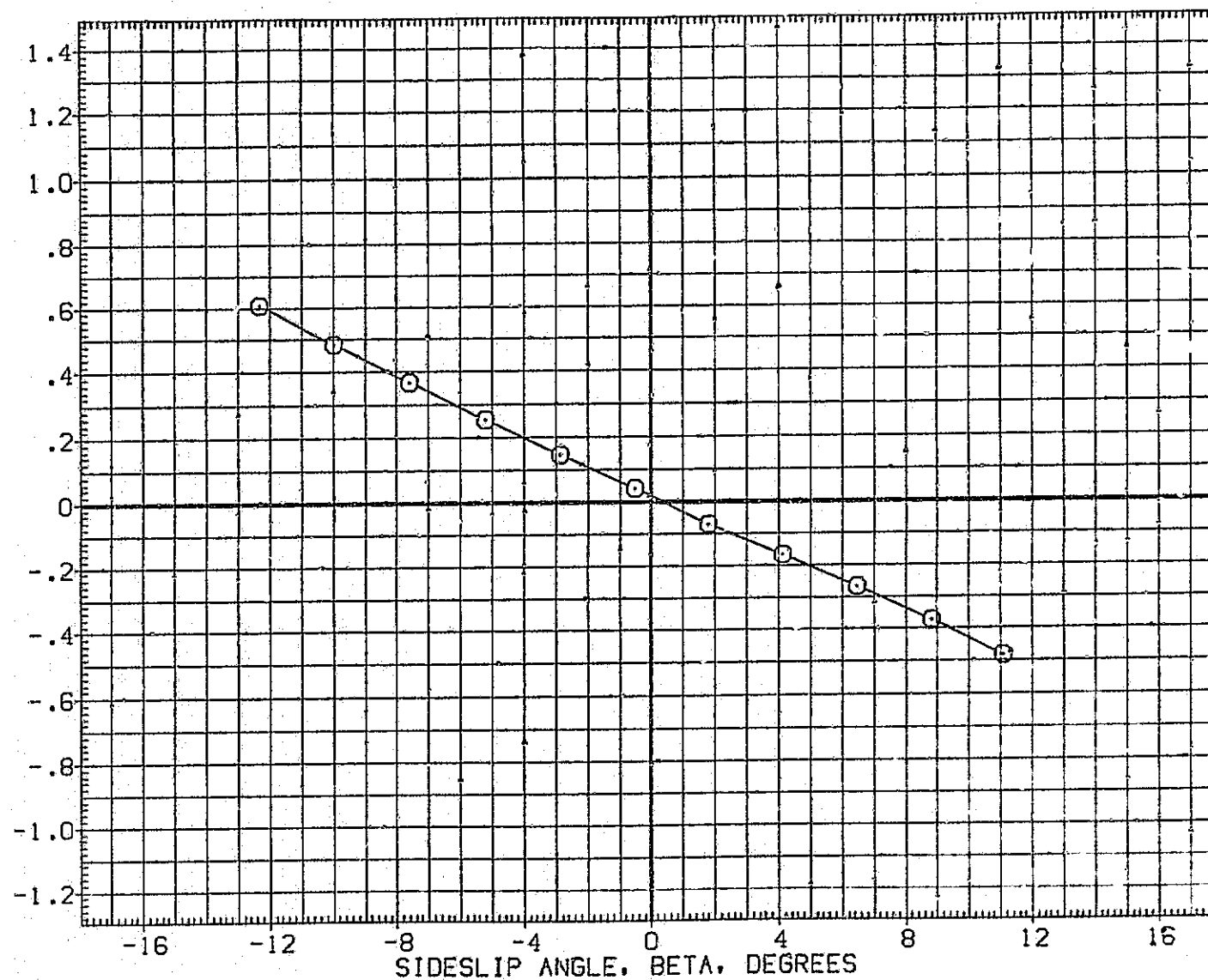


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
[A1C008]	MSFC 594(1A33) 740TS (TIPIS1P201)	ORB STING
[A1C036]	DATA NOT AVAILABLE	
[A1C022]	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

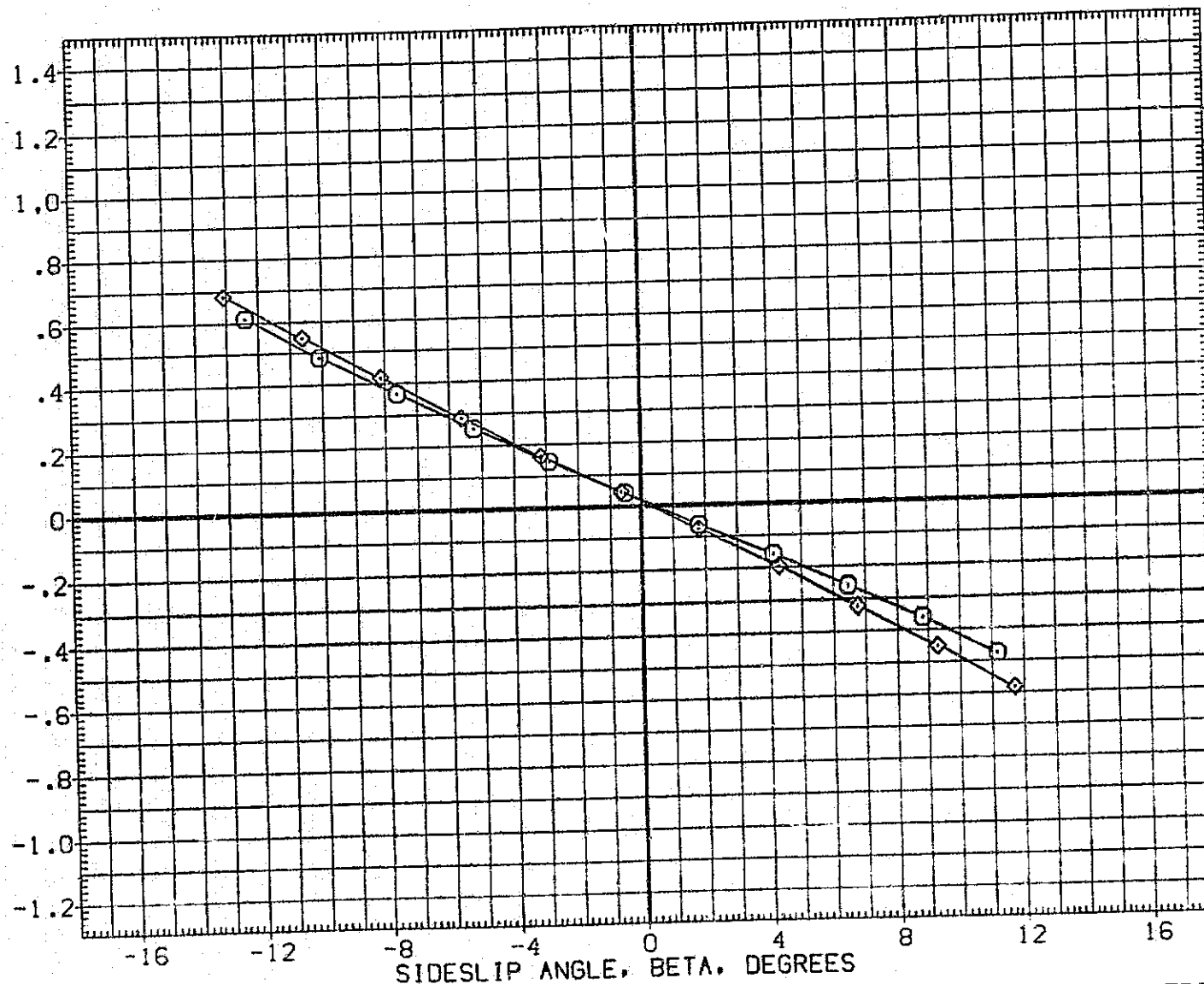


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC S94(1A33) 740TS (T1P1S1P201)	ORB STING
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	MSFC S94(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

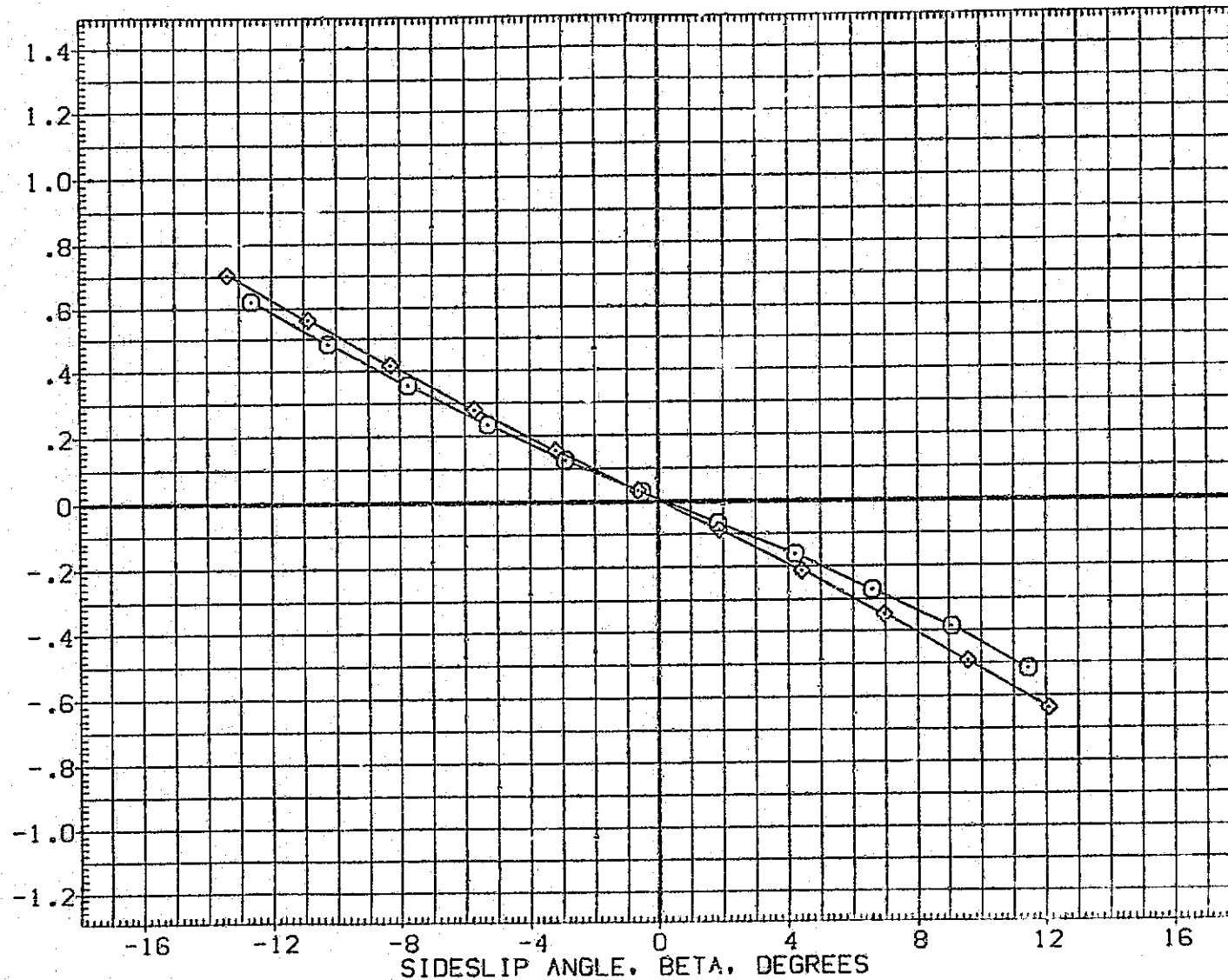


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(F)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

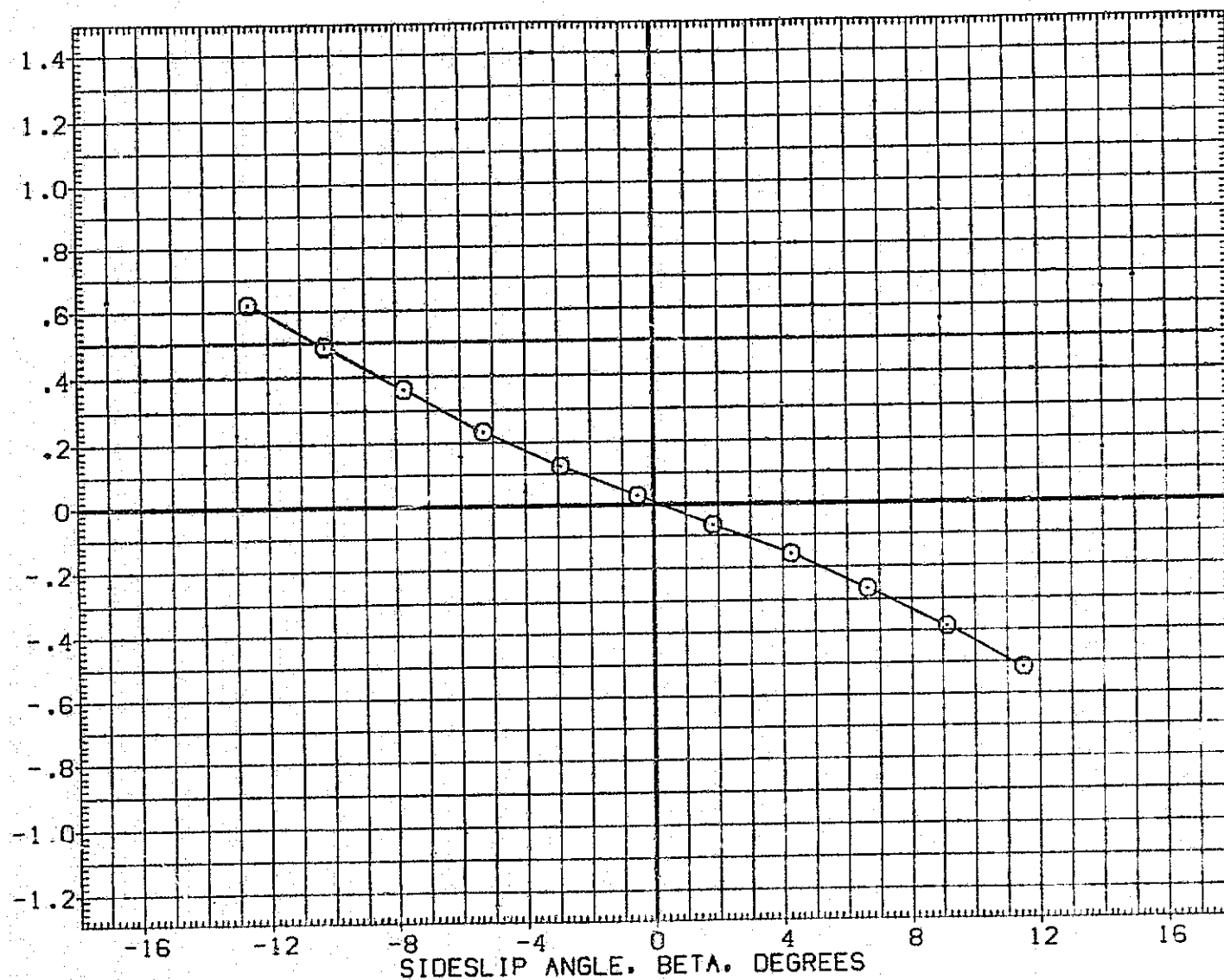


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (G)MACH = 1.47

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(A1C008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(A1C036)	DATA NOT AVAILABLE	
(A1C022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

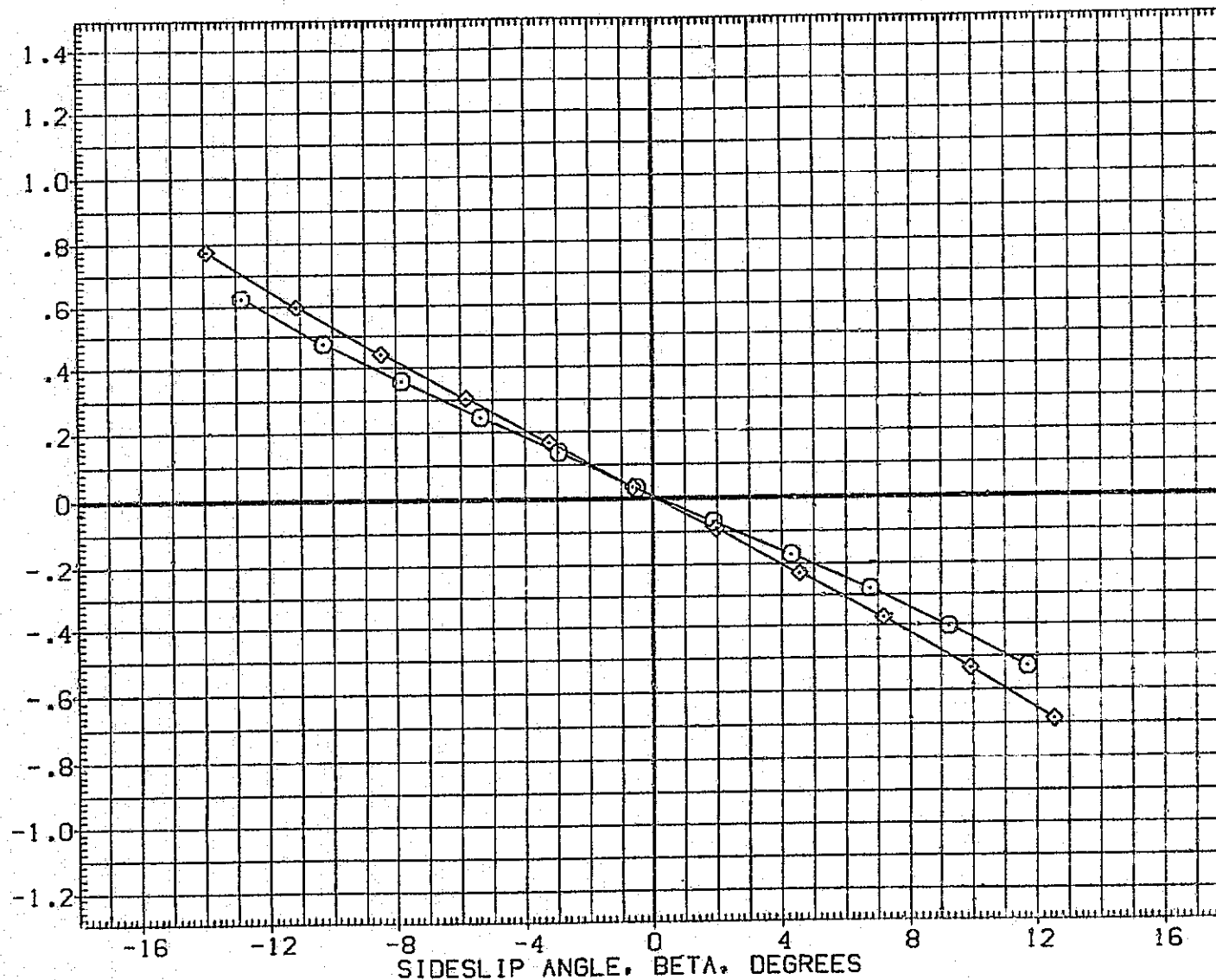


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (H)MACH = 1.97

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(A1C001)	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING
(A1C036)	DATA NOT AVAILABLE	
(A1C022)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

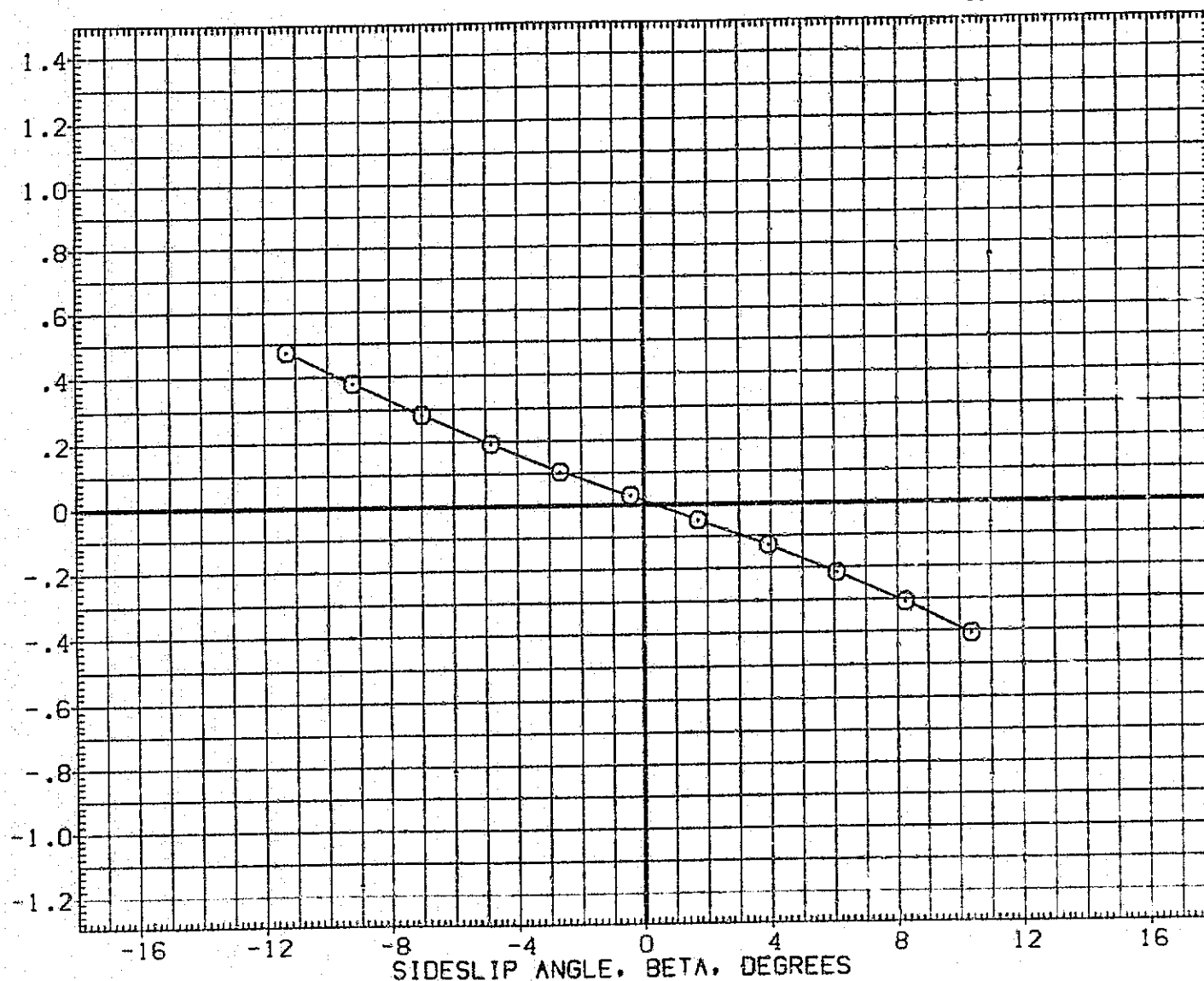


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (1)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
[AIC008] ○	MSFC 594(1A33) 740TS (T1P1S1P201) ORB STING
[AIC036] □	MSFC 594(1A33) 740TS (T1P1S3P201F2) ORB STING
[AIC022] ◇	MSFC 594(1A33) 740TS (T2P1S3P201F2) ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

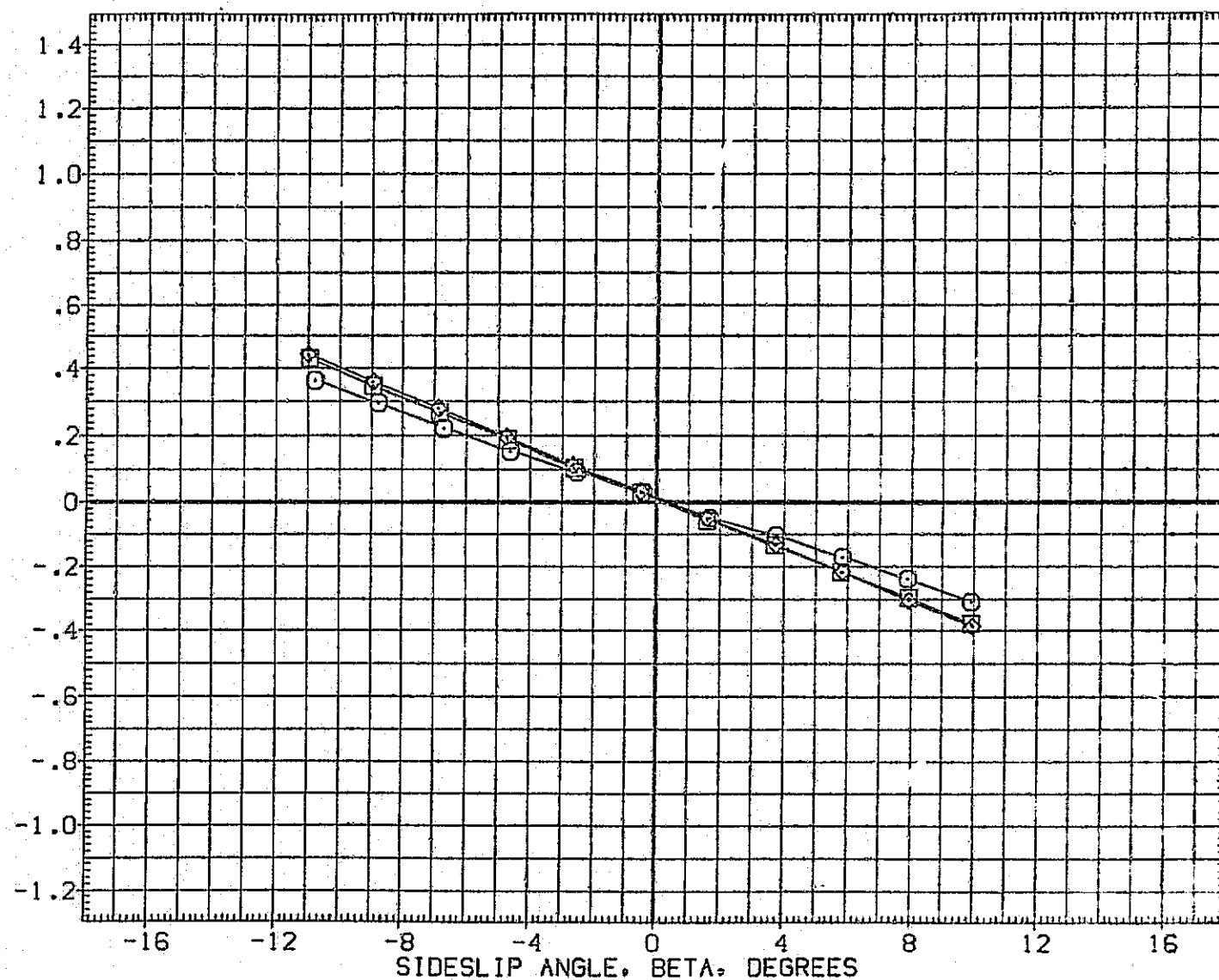


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(A1C008)	MSFC 594(1A33) 740TS (T1PISIP201)	ORB STING
(A1C036)	DATA NOT AVAILABLE	
(A1C022)	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

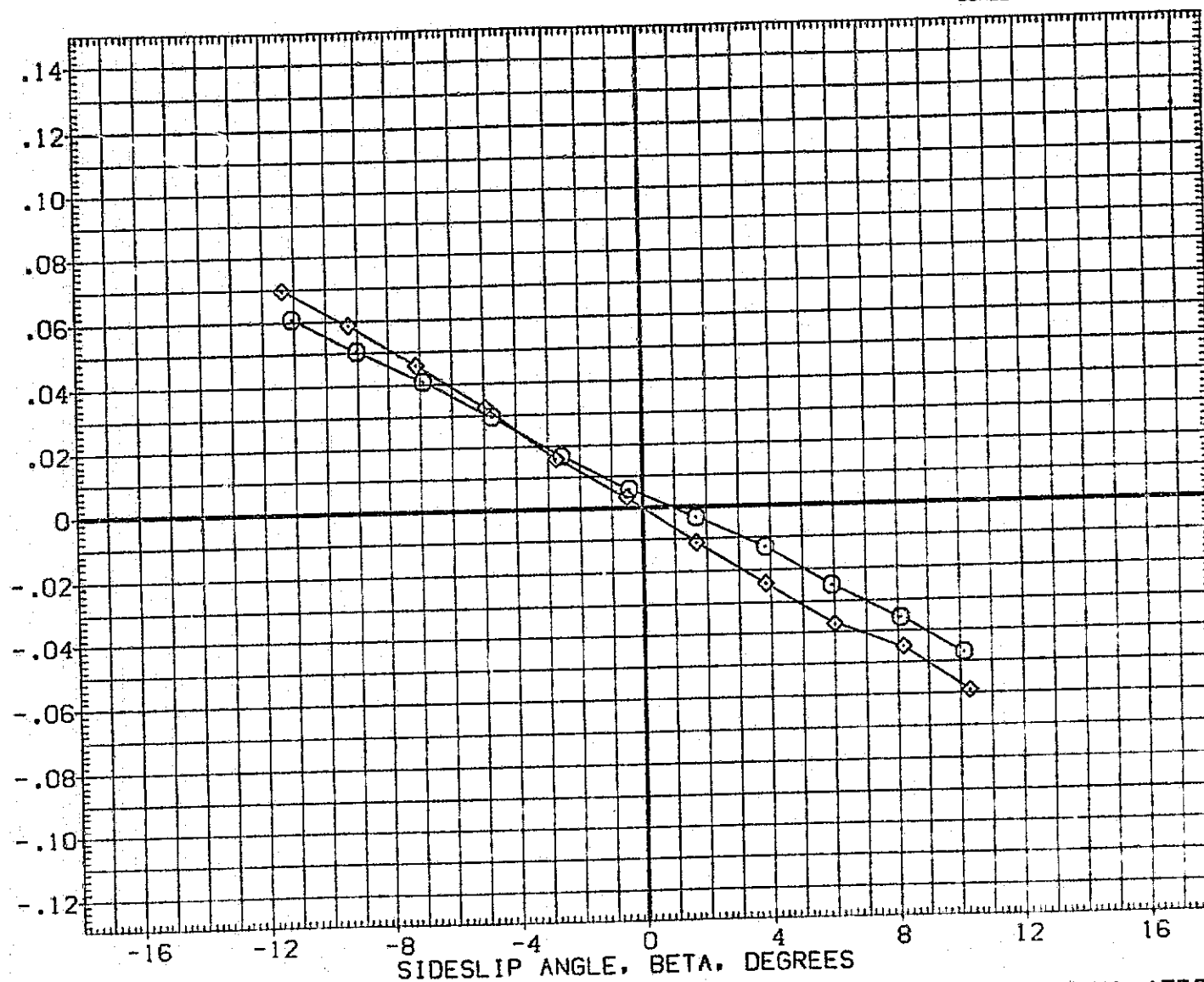


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(AIC008)	MSFC S94(1A33) 740TS (TIPIS1P201)	ORB STING
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

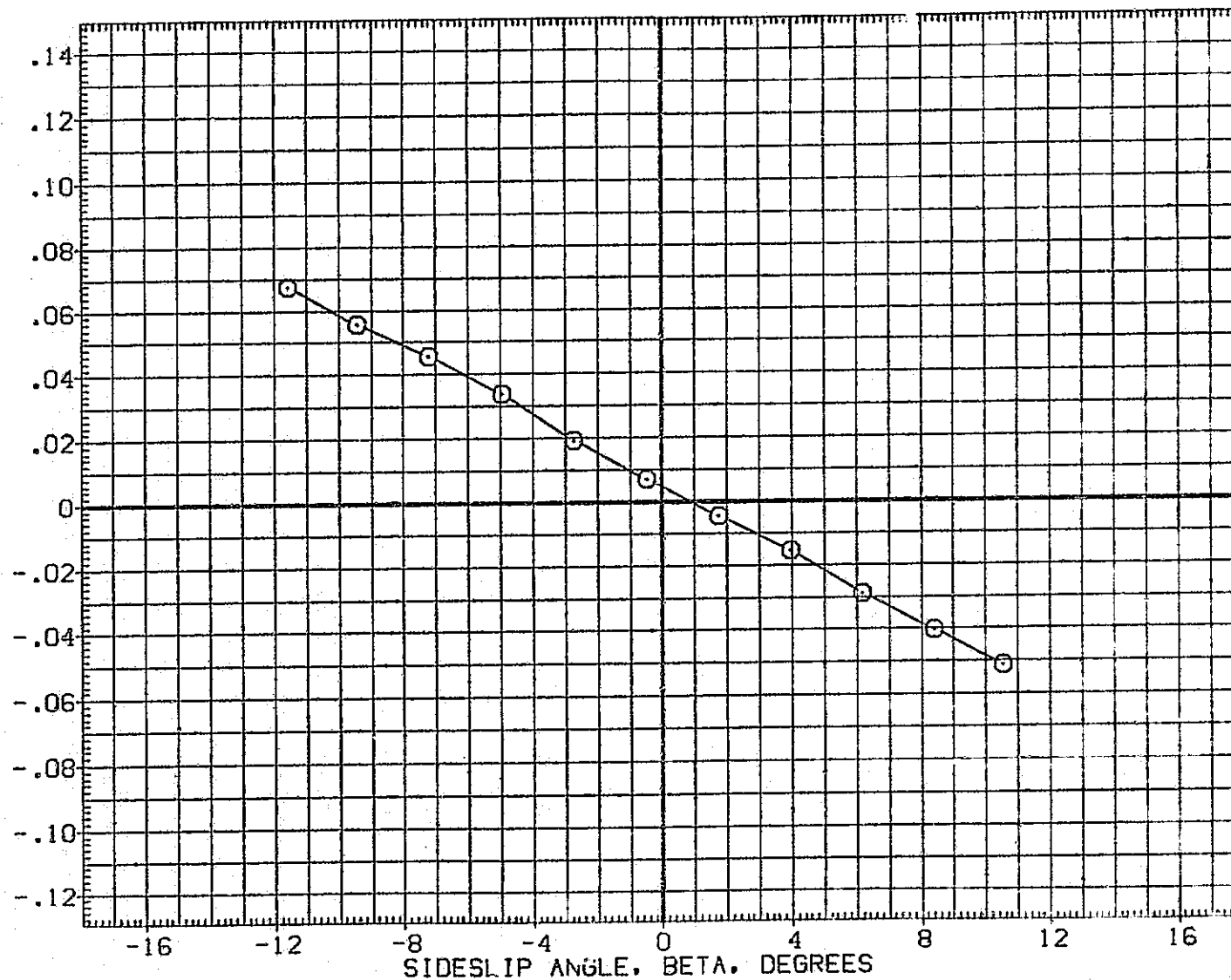


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(A1C008)	MSFC S94(1A33) 740TS (T1P1S1P201)	ORB STING
(A1C036)	DATA NOT AVAILABLE	
(A1C022)	MSFC S94(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

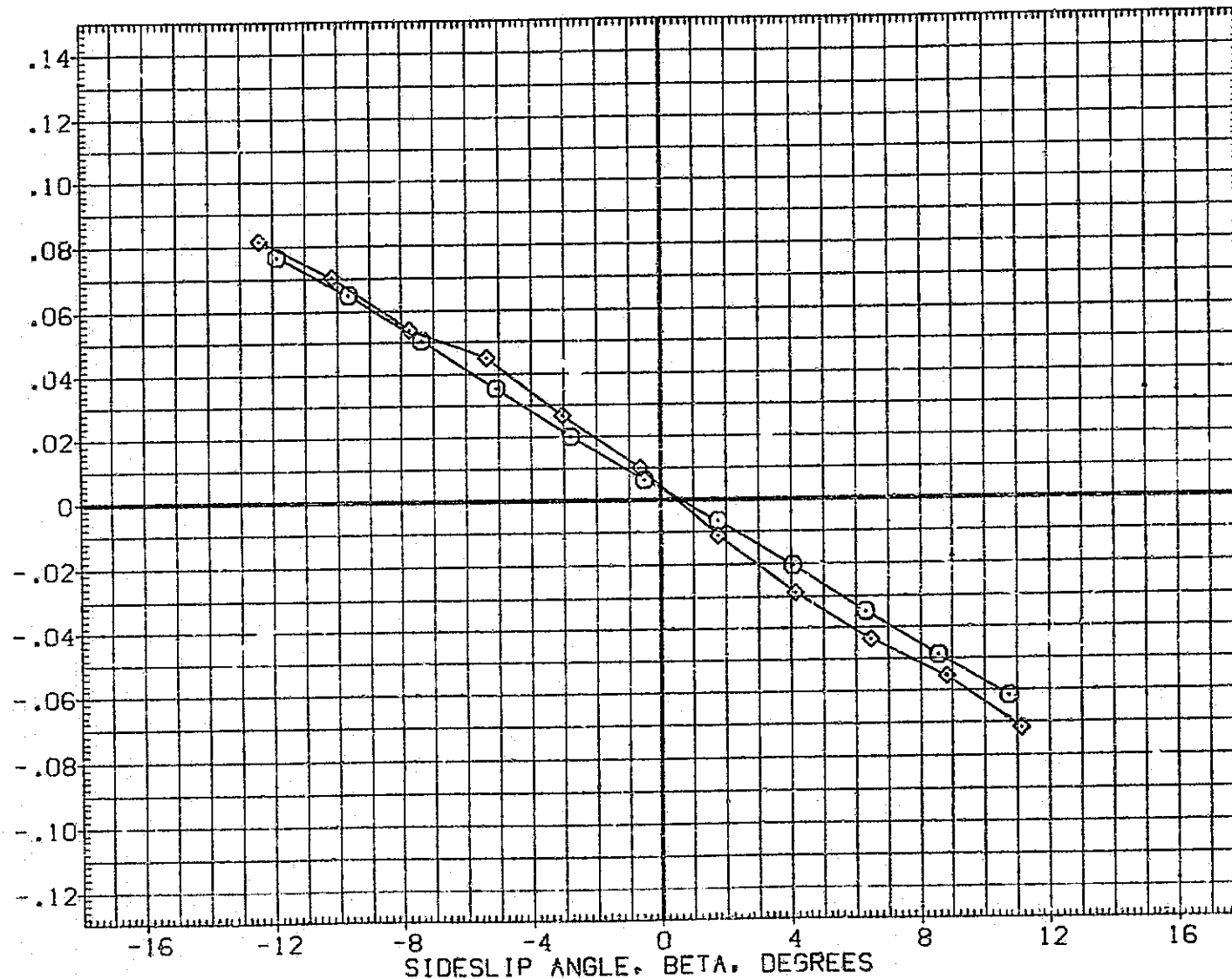


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

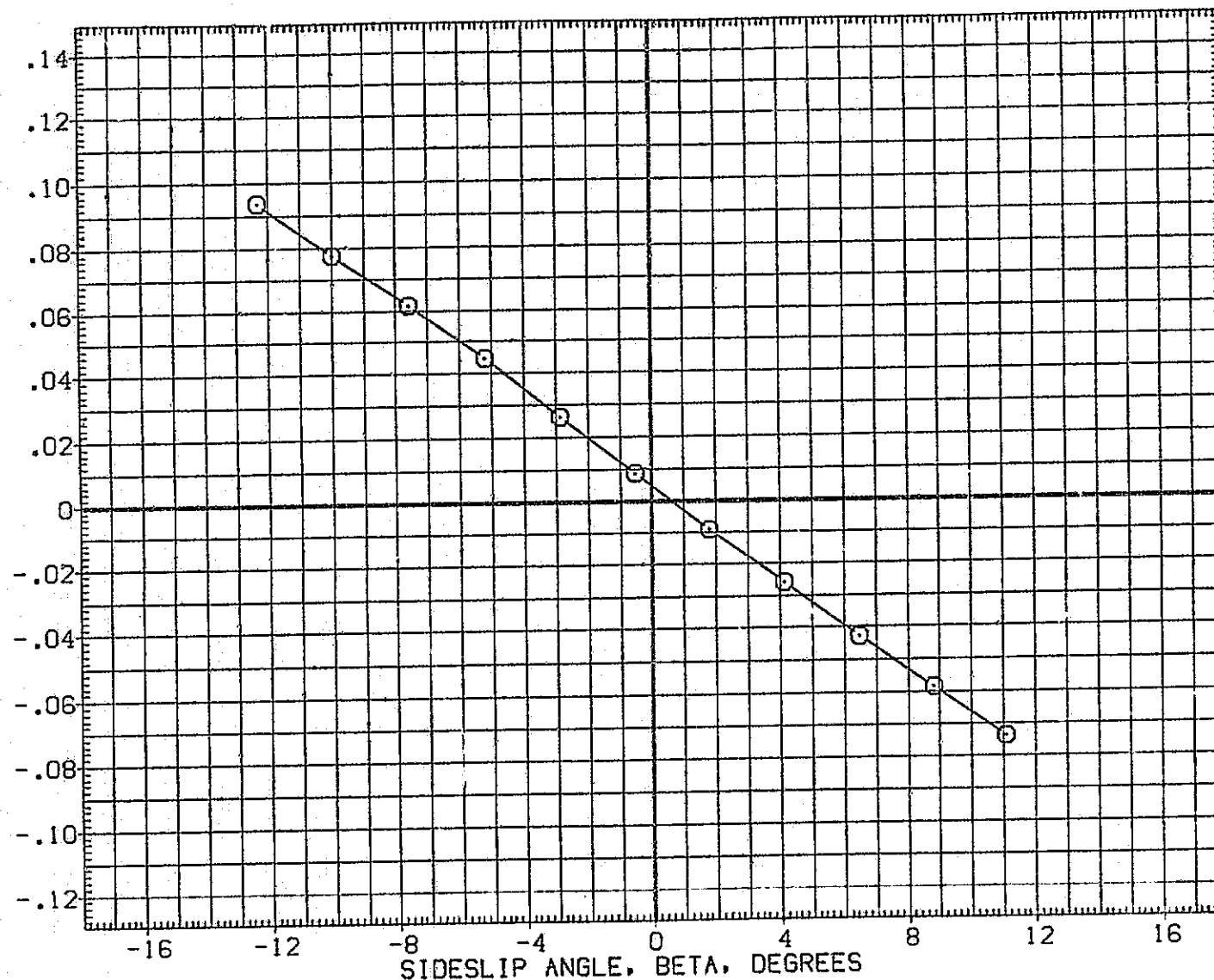


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

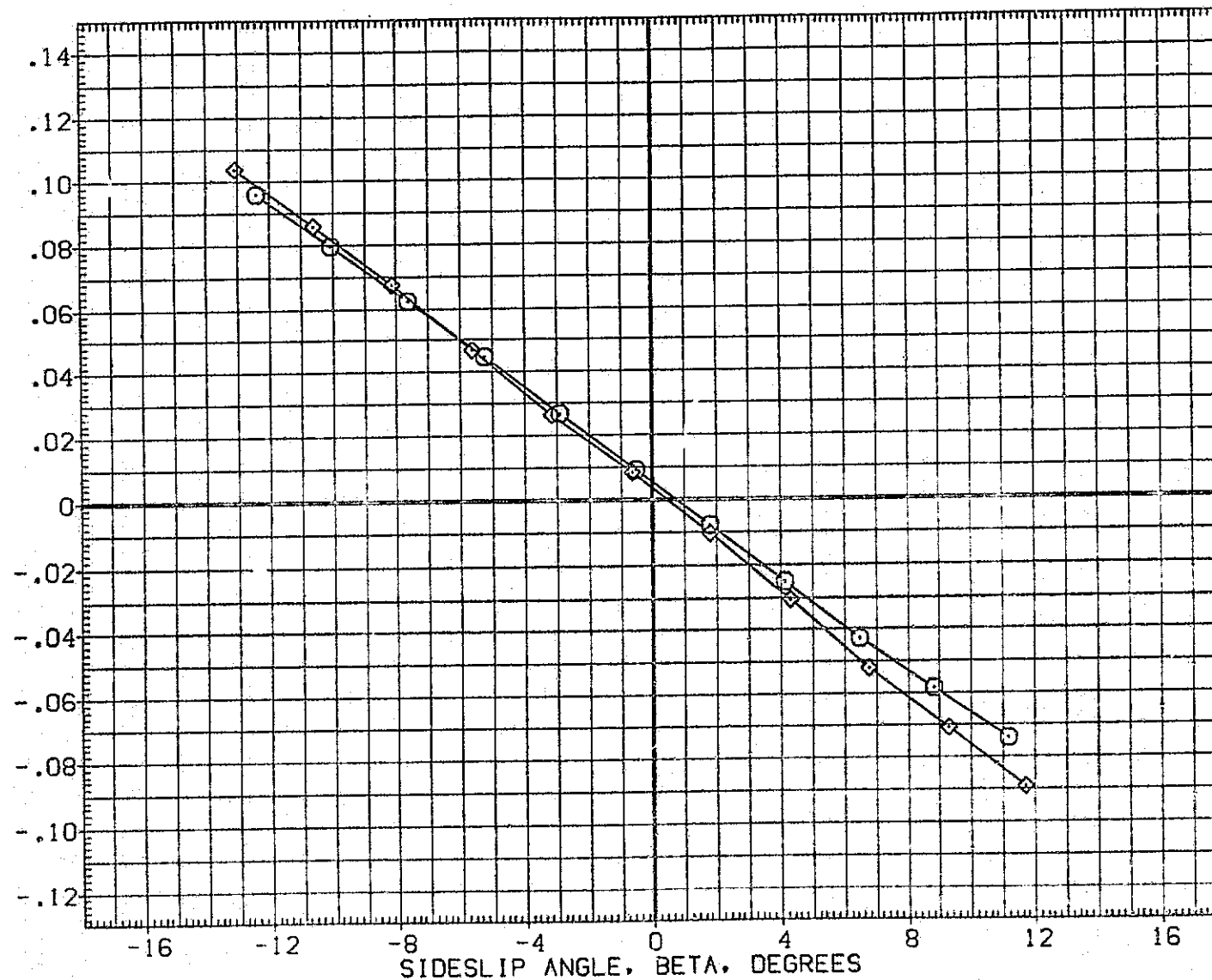


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(AIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(AIC035)	DATA NOT AVAILABLE	
(AIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SD, FT
LREF	1290.0000	IN.
SREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

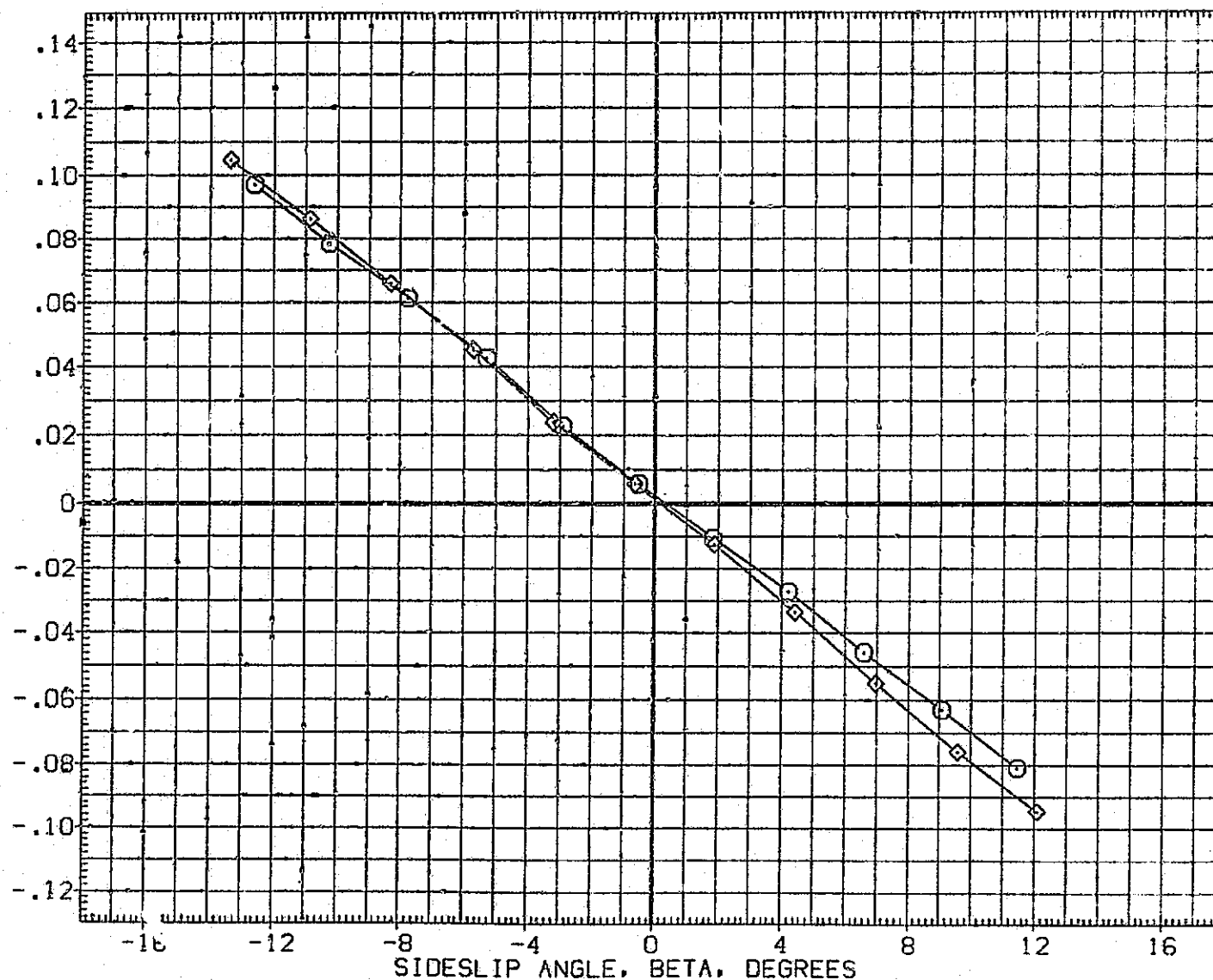


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(F)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	DRG STING
[AIC008]	MSFC 594(A33) 740TS (TIPISIP201)	
[AIC036]	DATA NOT AVAILABLE	
[AIC022]	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

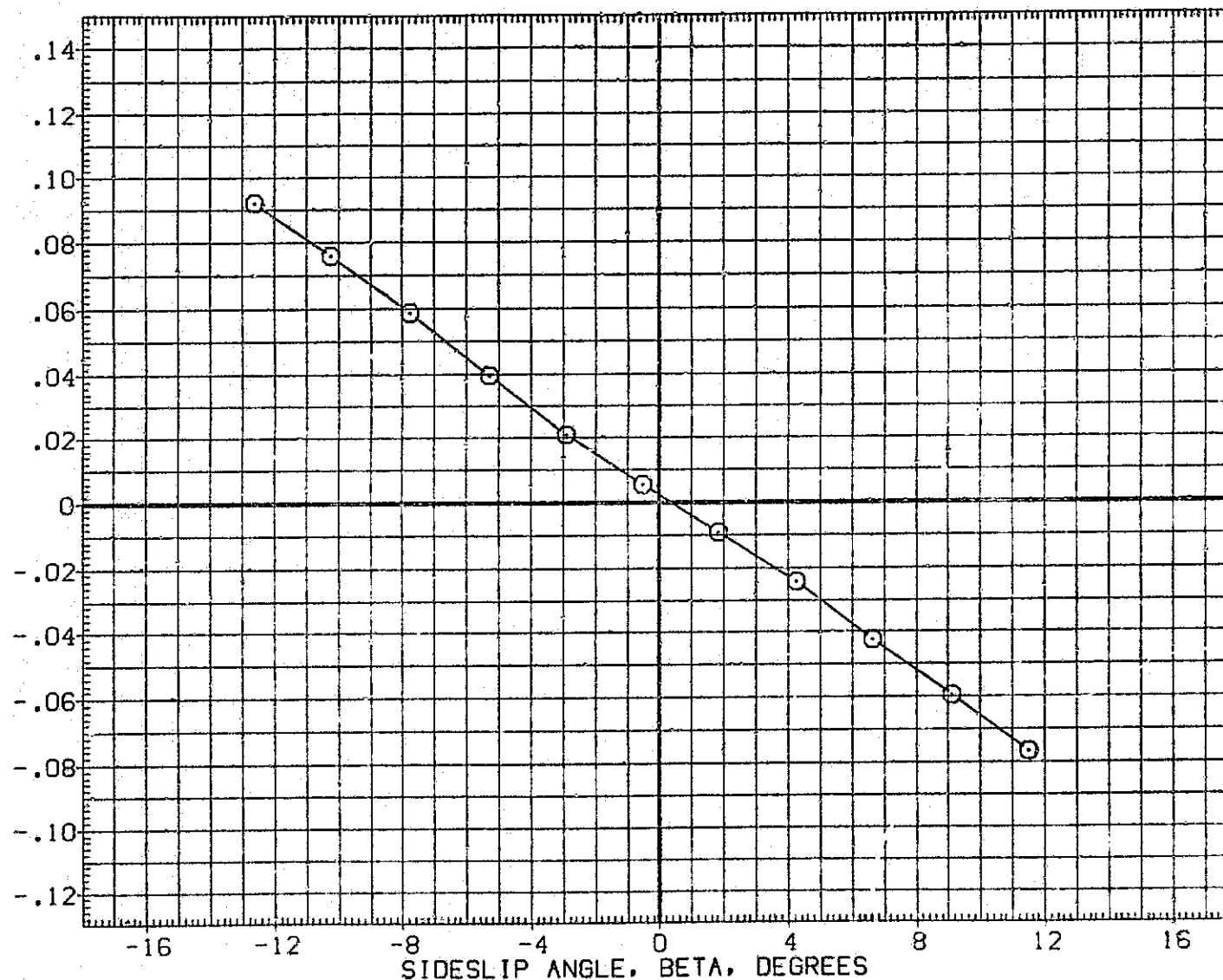


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO

(G)MACH = 1.47

PAGE 625

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB S'ING
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB S'ING
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

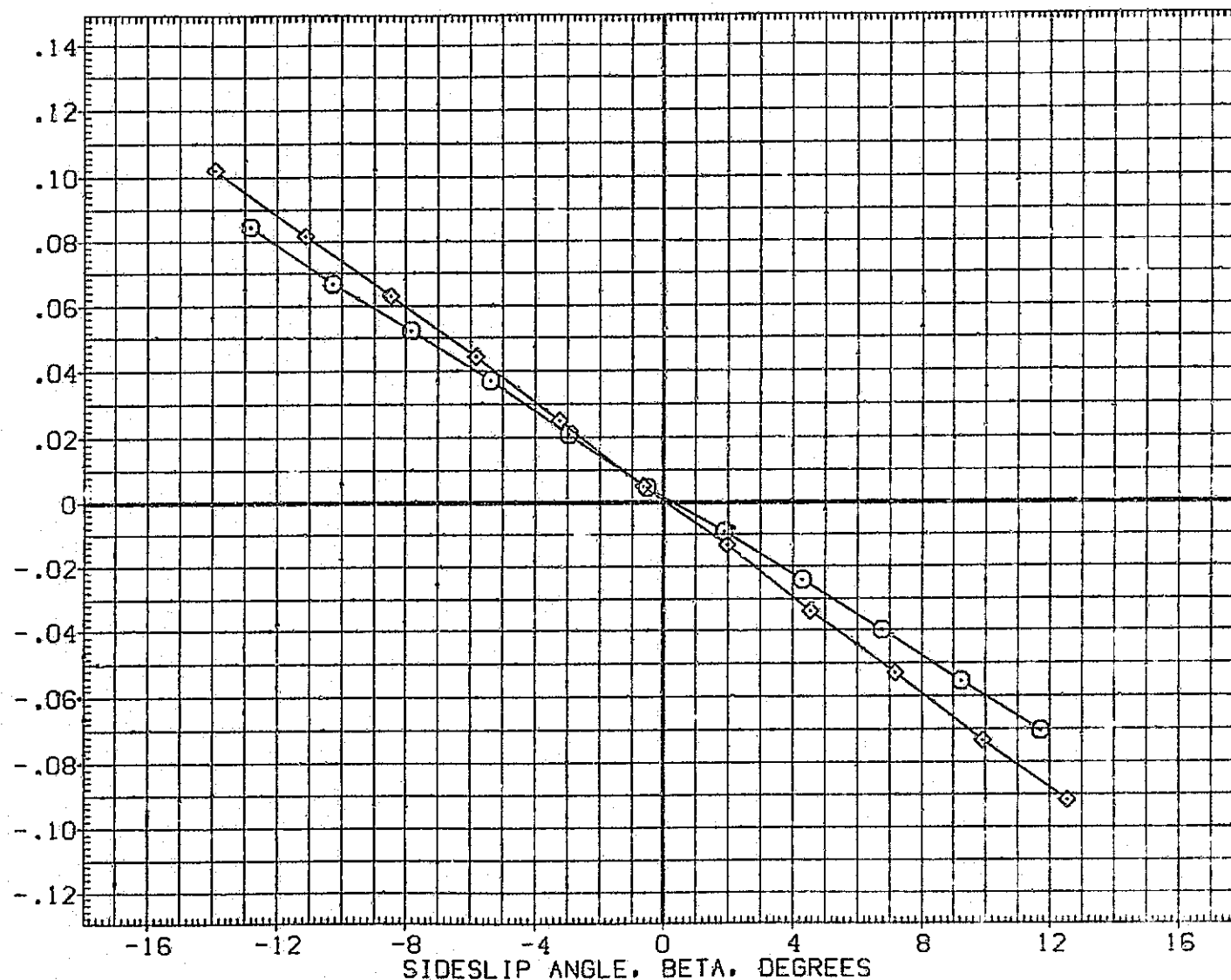


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(H)MACH = 1.97

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SGREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

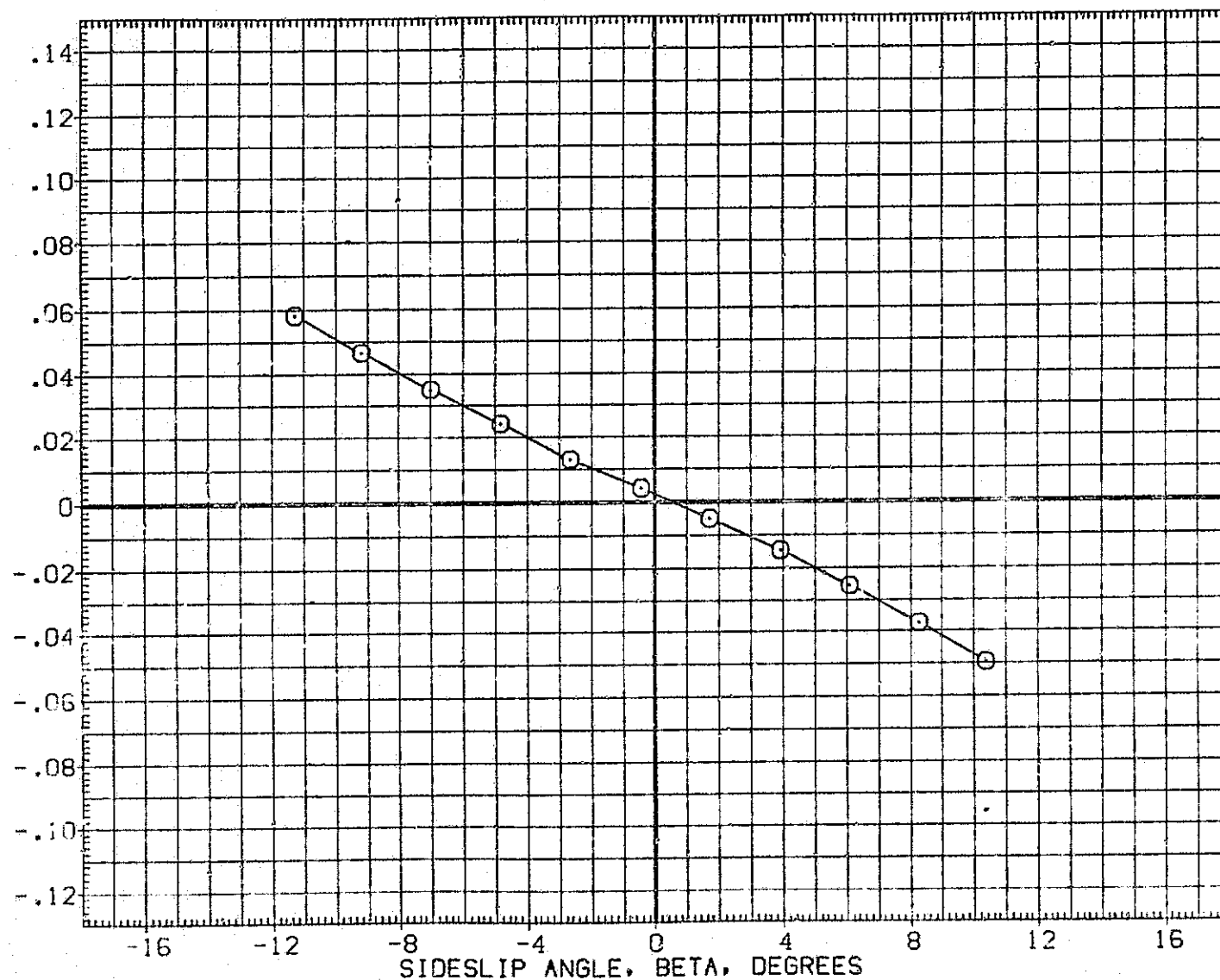


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (1)MACH = 2.99 PAGE 627

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(AIC036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(AIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

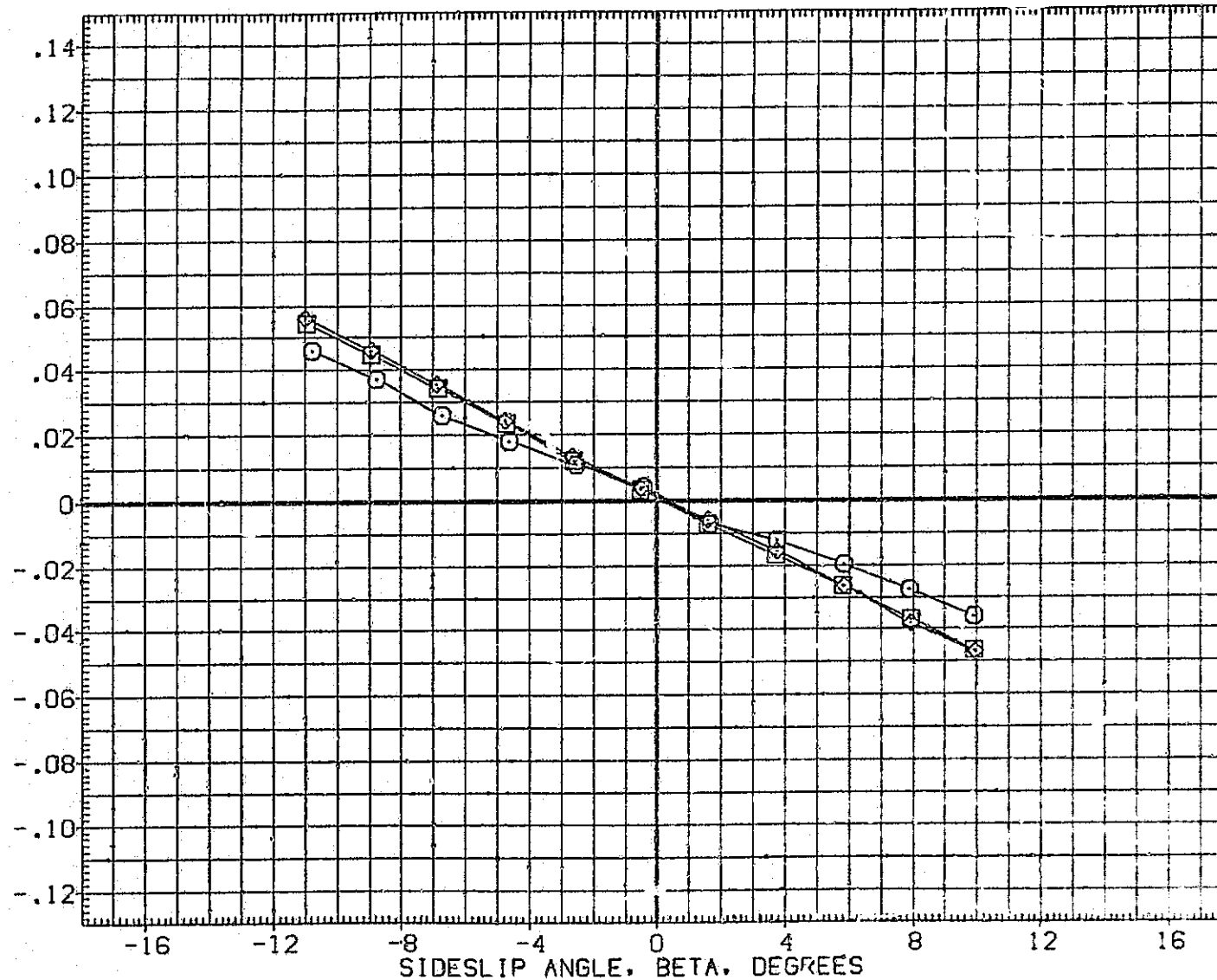


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(A1C008)	MSFC 594 (A33) 740TS (T1PISIP201)	ORB STING
(A1C036)	DATA NOT AVAILABLE	
(A1C022)	MSFC 594 (A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

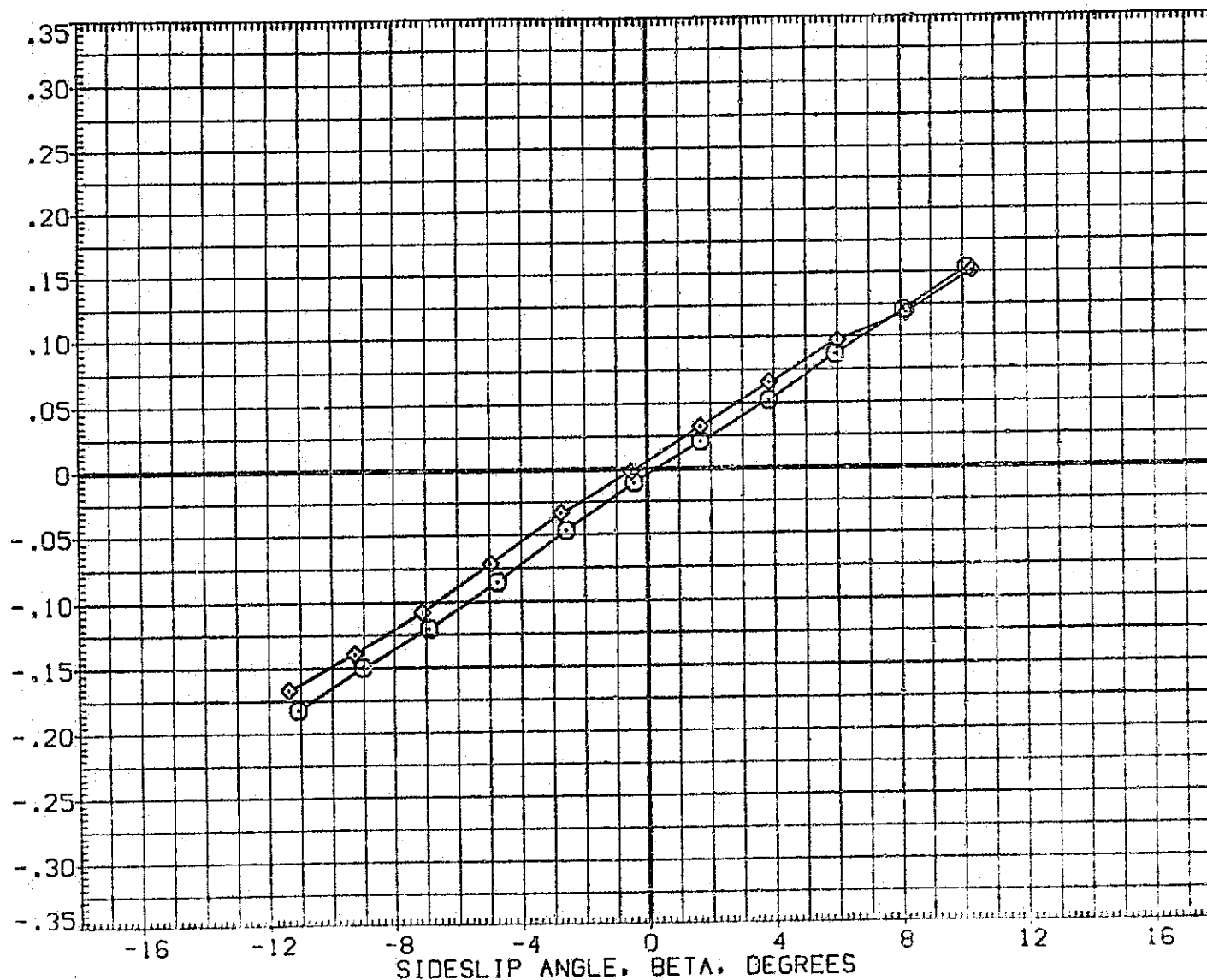


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

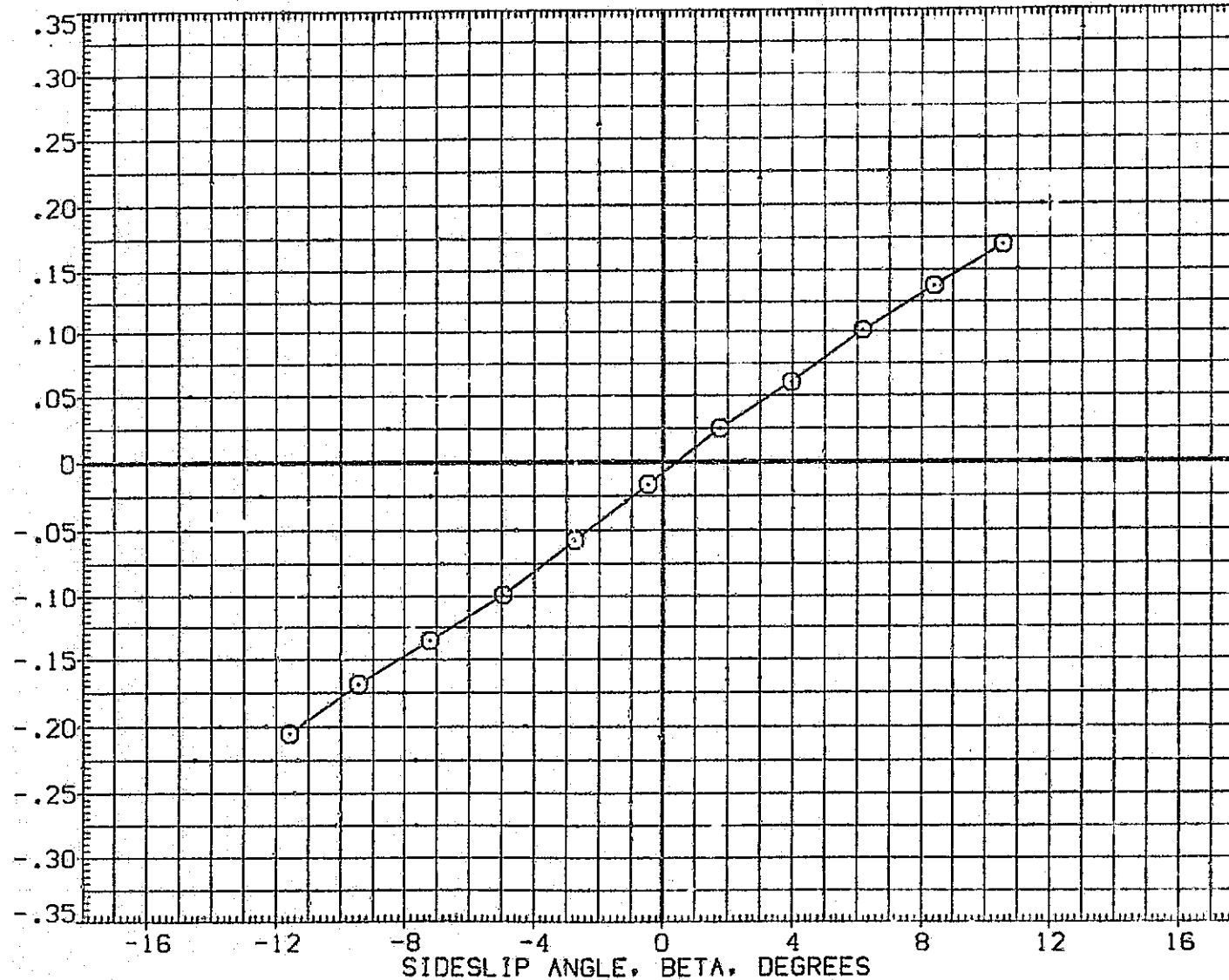


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (B)MACH = .80 PAGE 630

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

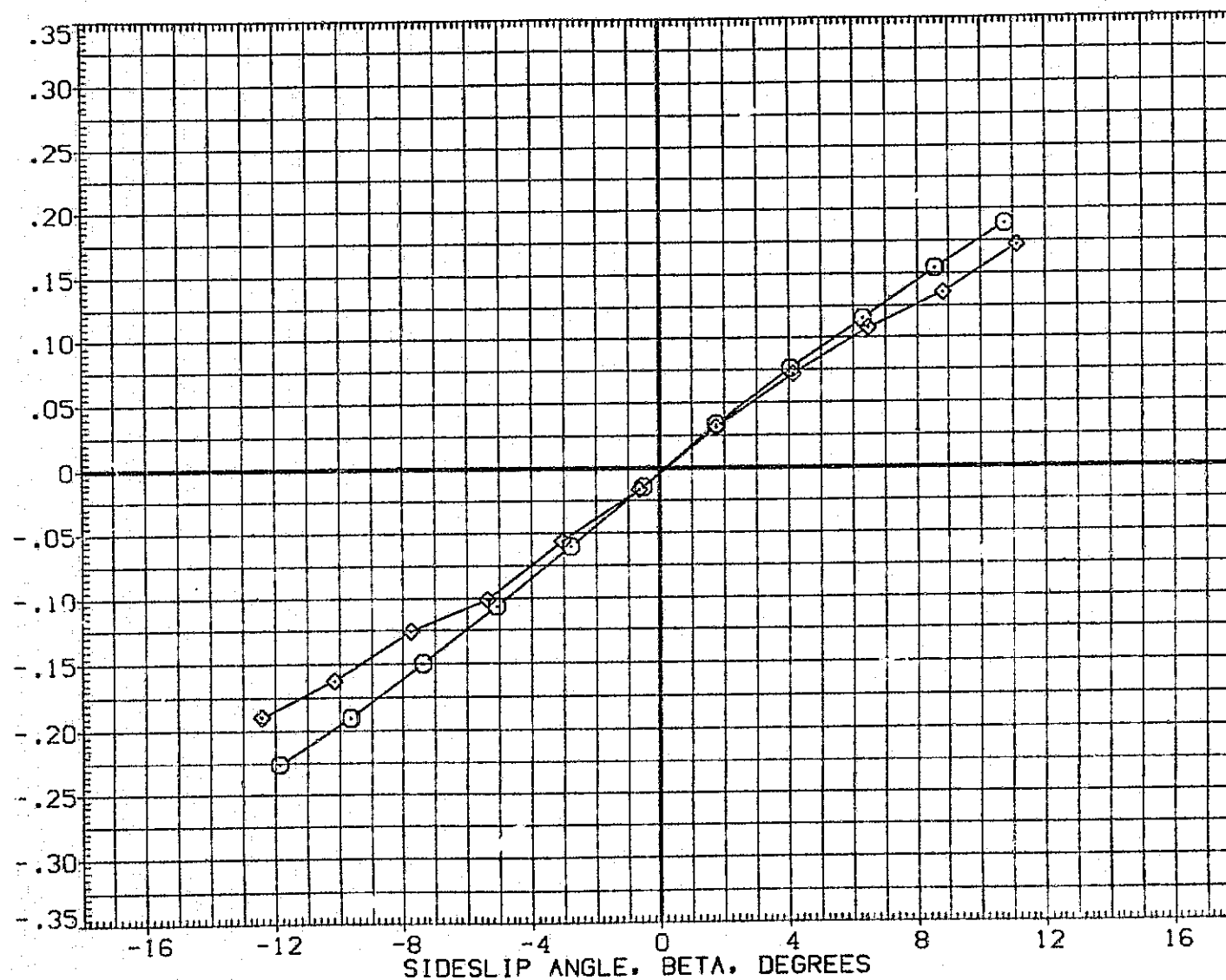


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	DRS STING
(AIC008)	MSFC 5941(A33) 740TS (TIPISIP201)	
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YI
ZMRP	400.0000	IN. ZI
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

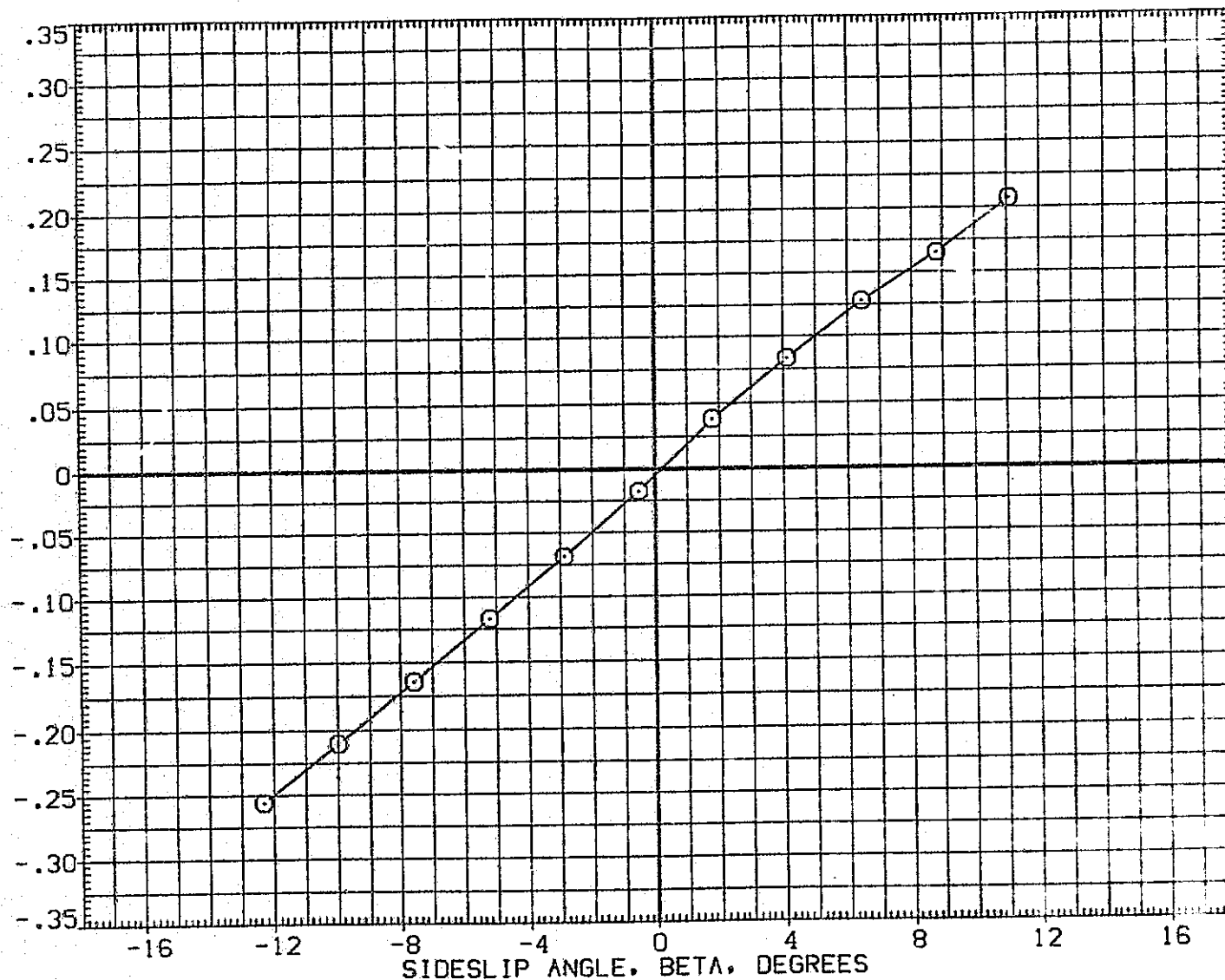


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(A1C008)	MSFC 594 (A33) 740TS (TIPISIP201)	ORB STING
(A1C036)	DATA NOT AVAILABLE	
(A1C022)	MSFC 594 (A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

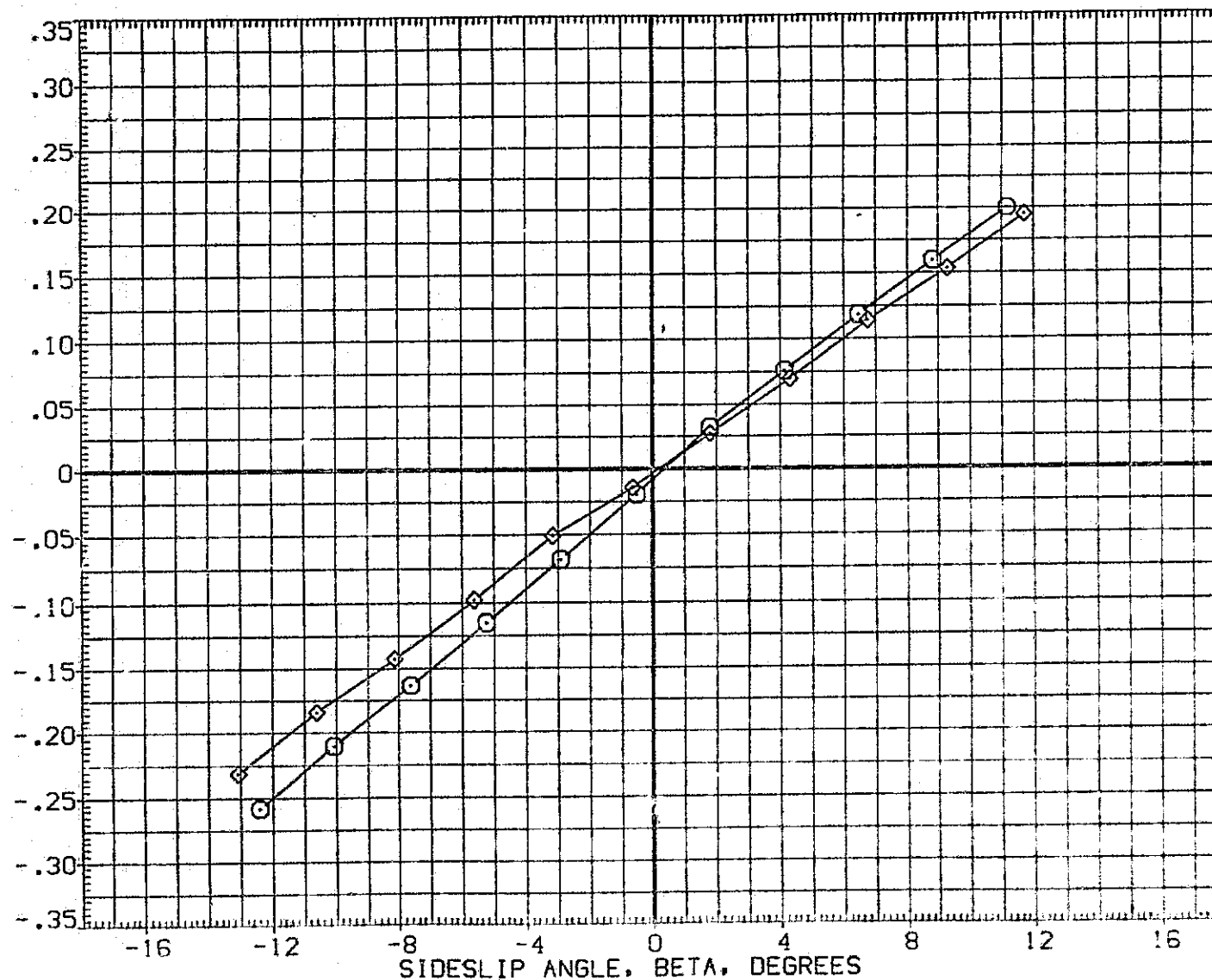


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (T1P1S1P2011)	ORB STING
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0240	

YAWING MOMENT COEFFICIENT, CYN

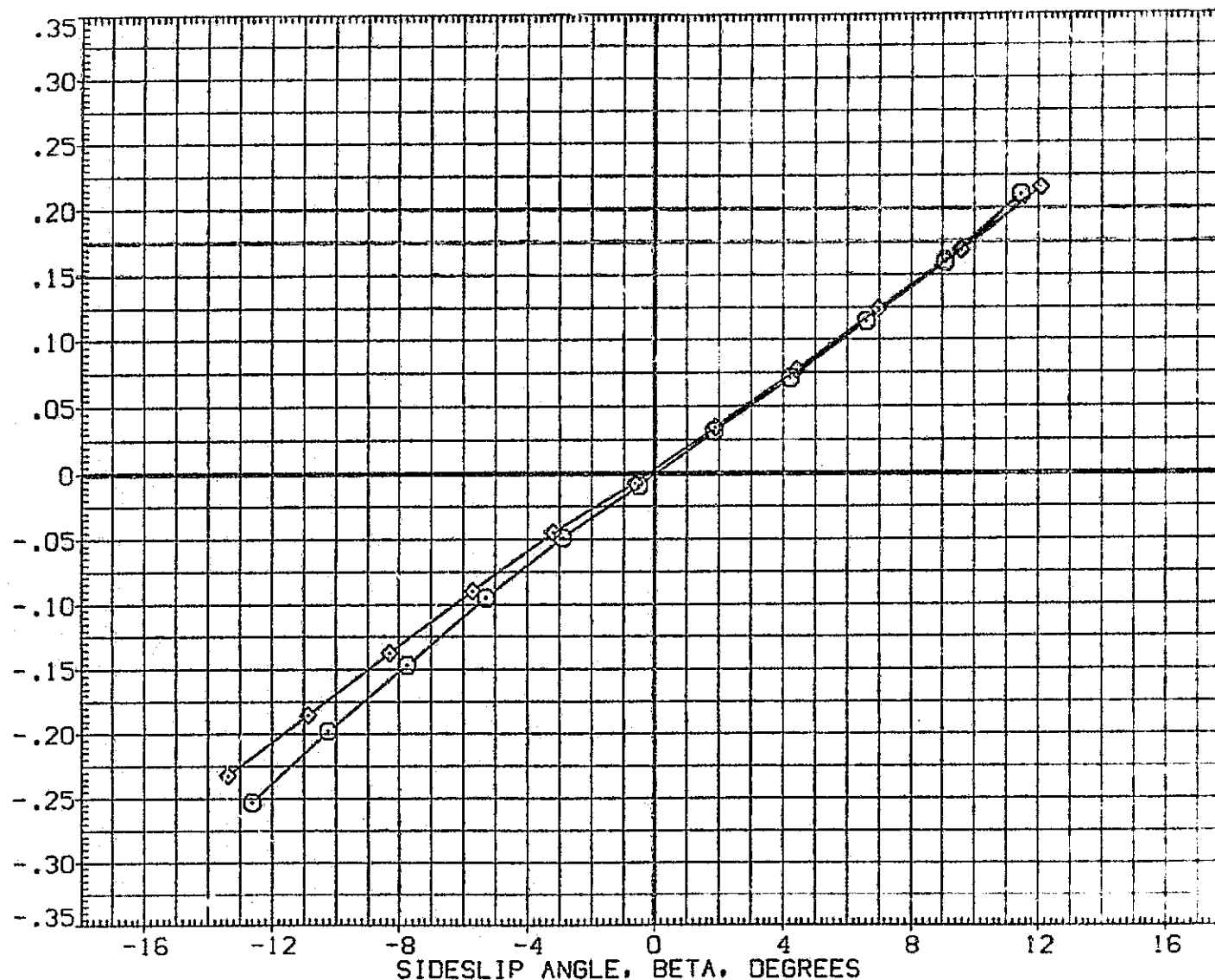


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(F)MACH = 1.25

DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING

(AIC008) ○ MSFC 594(1A33) 740TS (TIPISIP201)

(AIC036) □ DATA NOT AVAILABLE

(AIC022) ◇ DATA NOT AVAILABLE

REFERENCE INFORMATION

SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

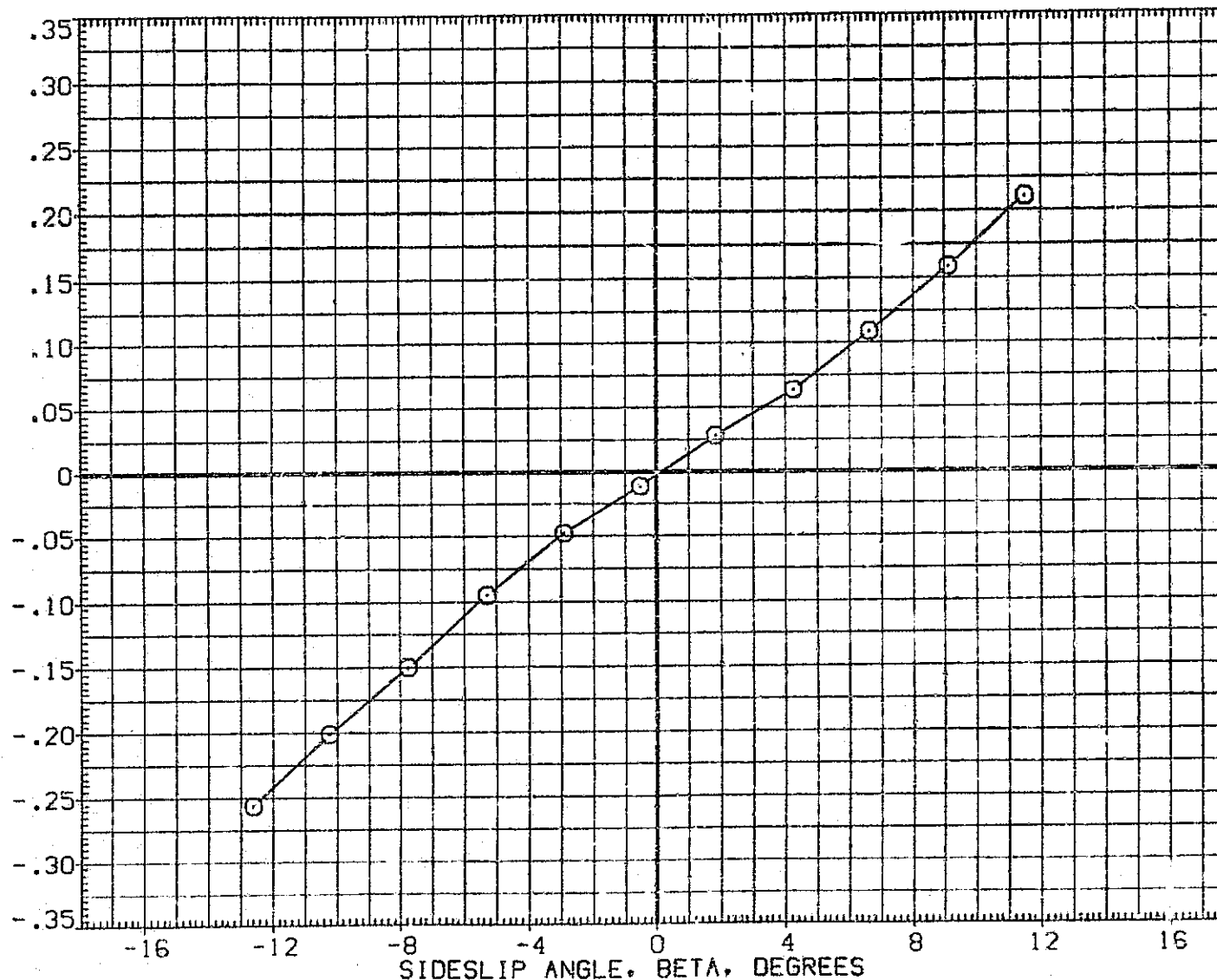


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (G)MACH = 1.47

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. YT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

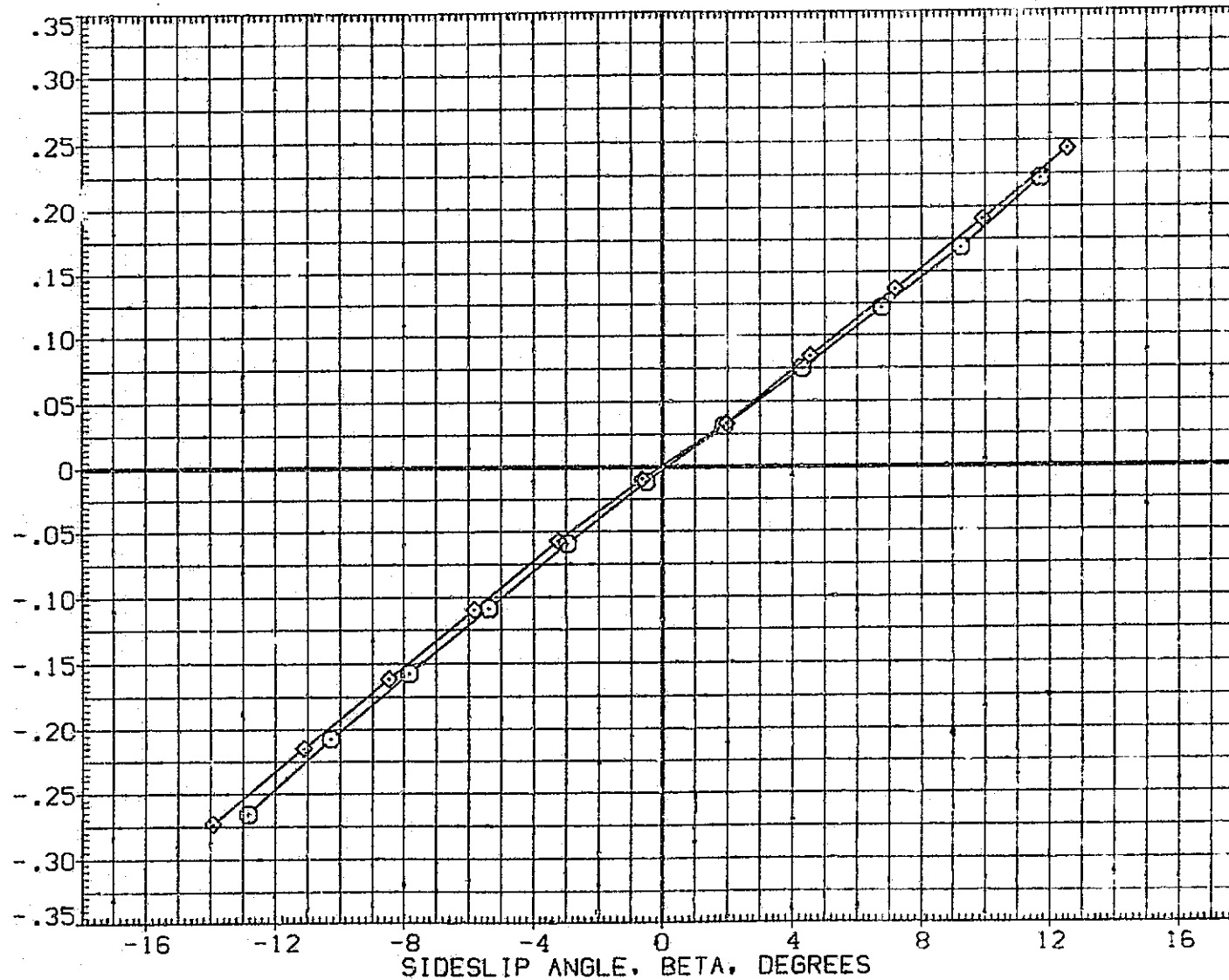


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(H)MACH = 1.97

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(AIC008)	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

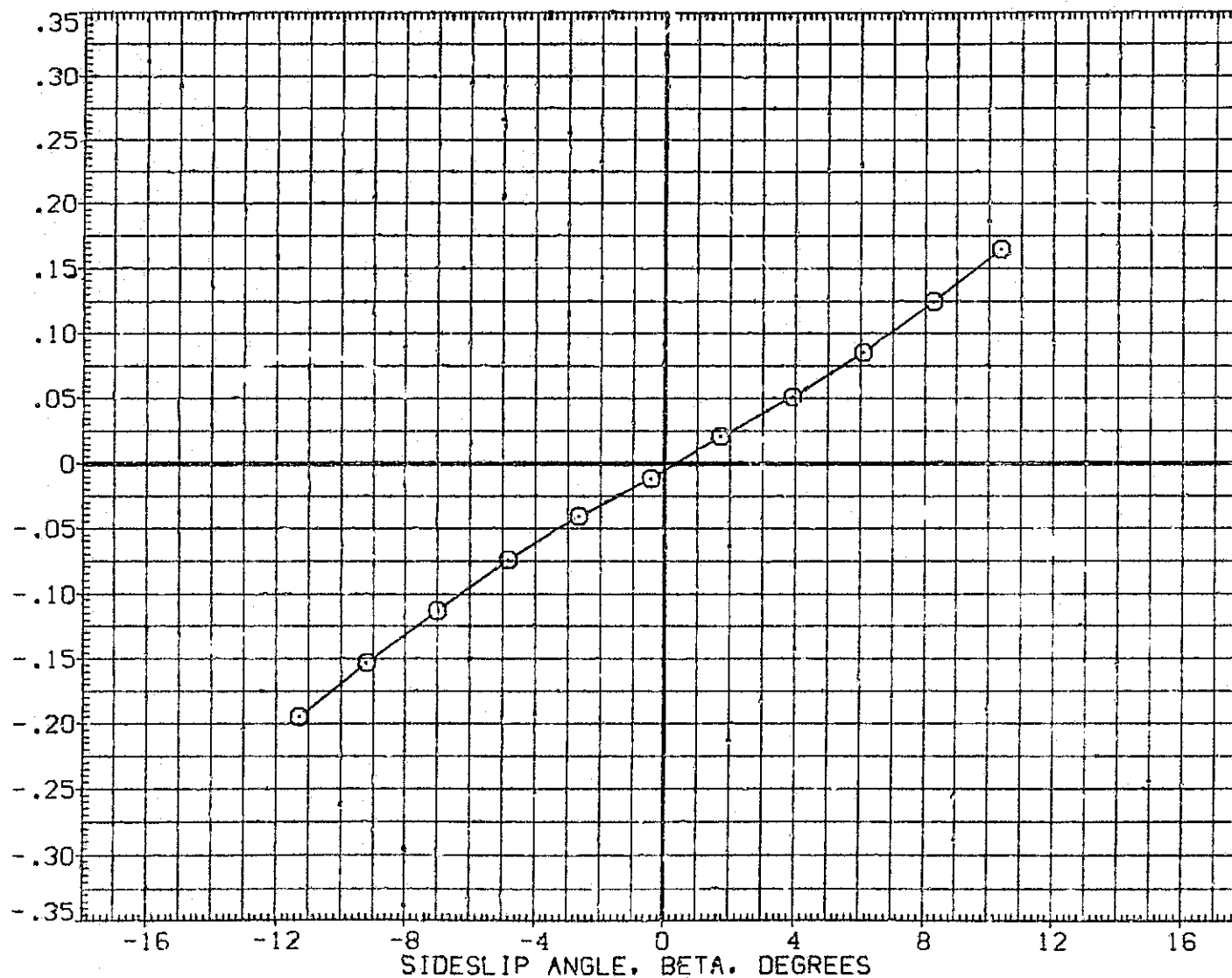


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (1)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(A1C008)	MSFC 594(1A33) 740TS (T1P1S1P2D1)	ORB STING
(A1C036)	MSFC 594(1A33) 740TS (T1P1S3P2D1F2)	ORB STING
(A1C022)	MSFC 594(1A33) 743TS (T2P1S3P2D1F2)	ORB STING

REFERENCE INFORMATION		
SRLF	2640.0000	SO. FT
LRLF	1290.0000	IN.
SRLE	1240.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

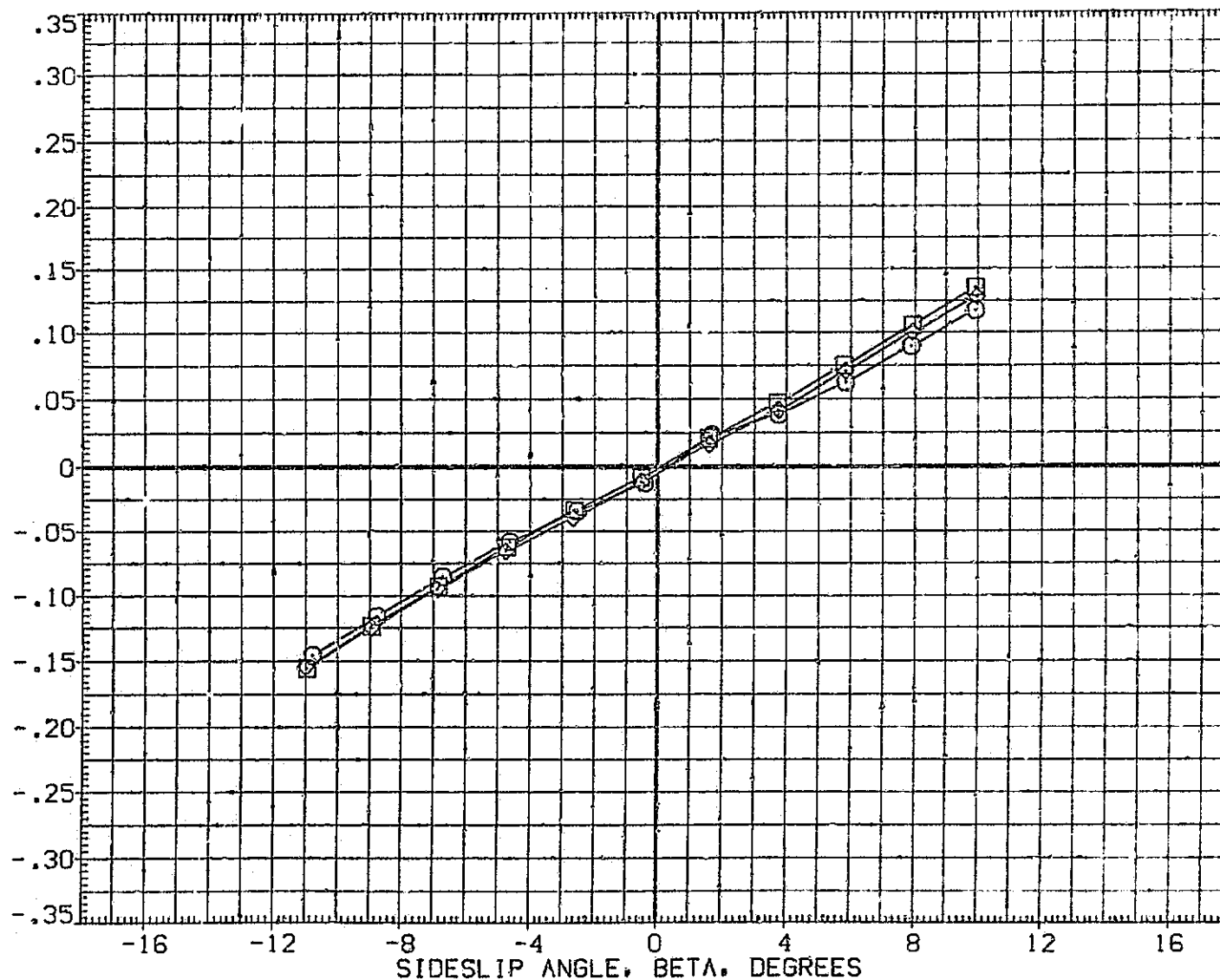


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
{AIC008}	MSFC 594(1A33) 740TS (T1PISIP201)	ORB STING
{AIC036}	DATA NOT AVAILABLE	
{AIC022}	MSFC 594(1A33) 740TS (T2PIS3P20IF2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

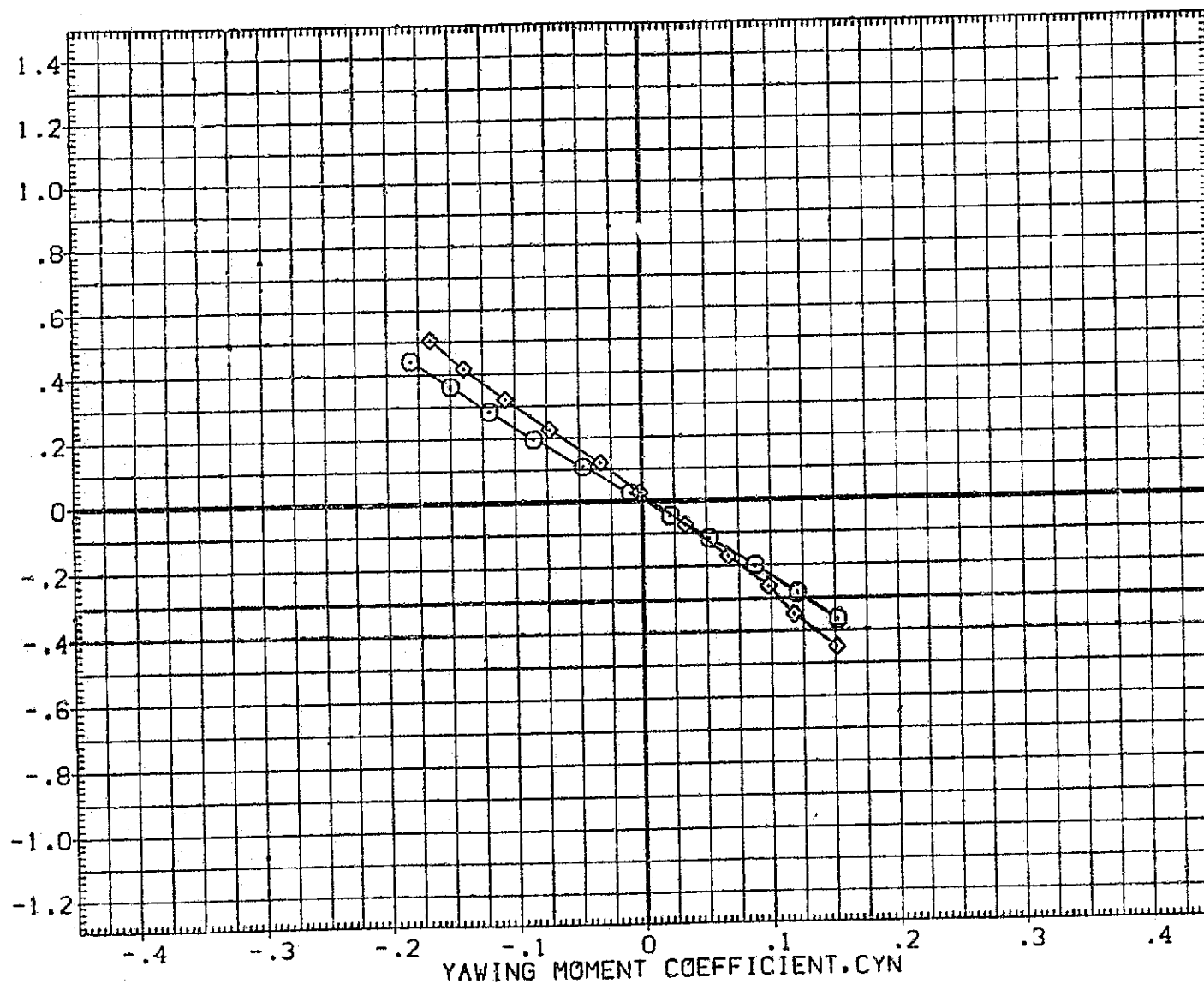


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 594(1A33) 740TS (TIPIS1P201)	ORB STING
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

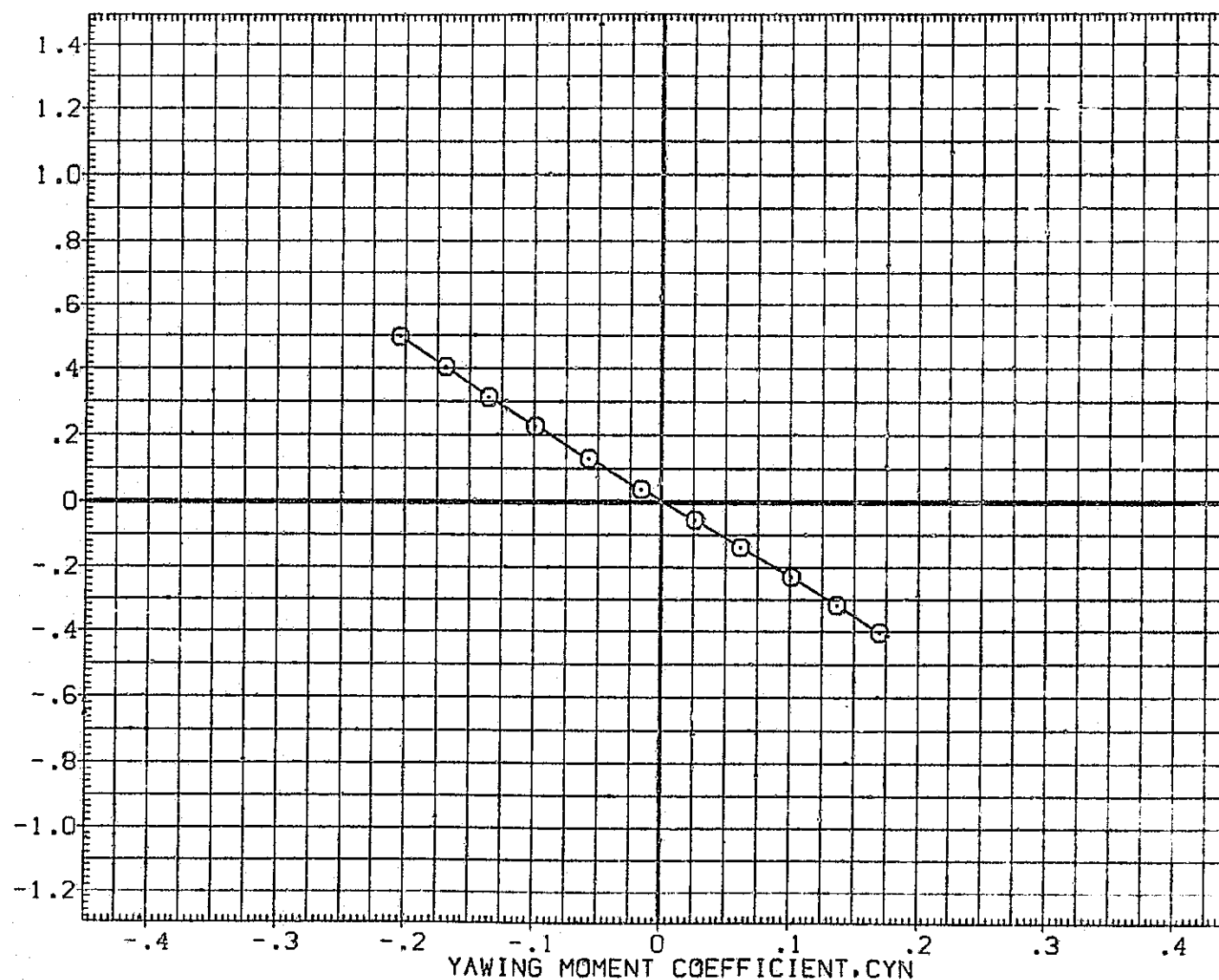


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(A1C008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(A1C035)	DATA NOT AVAILABLE	
(A1C022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
CREF	1290.0000	IN.
YMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

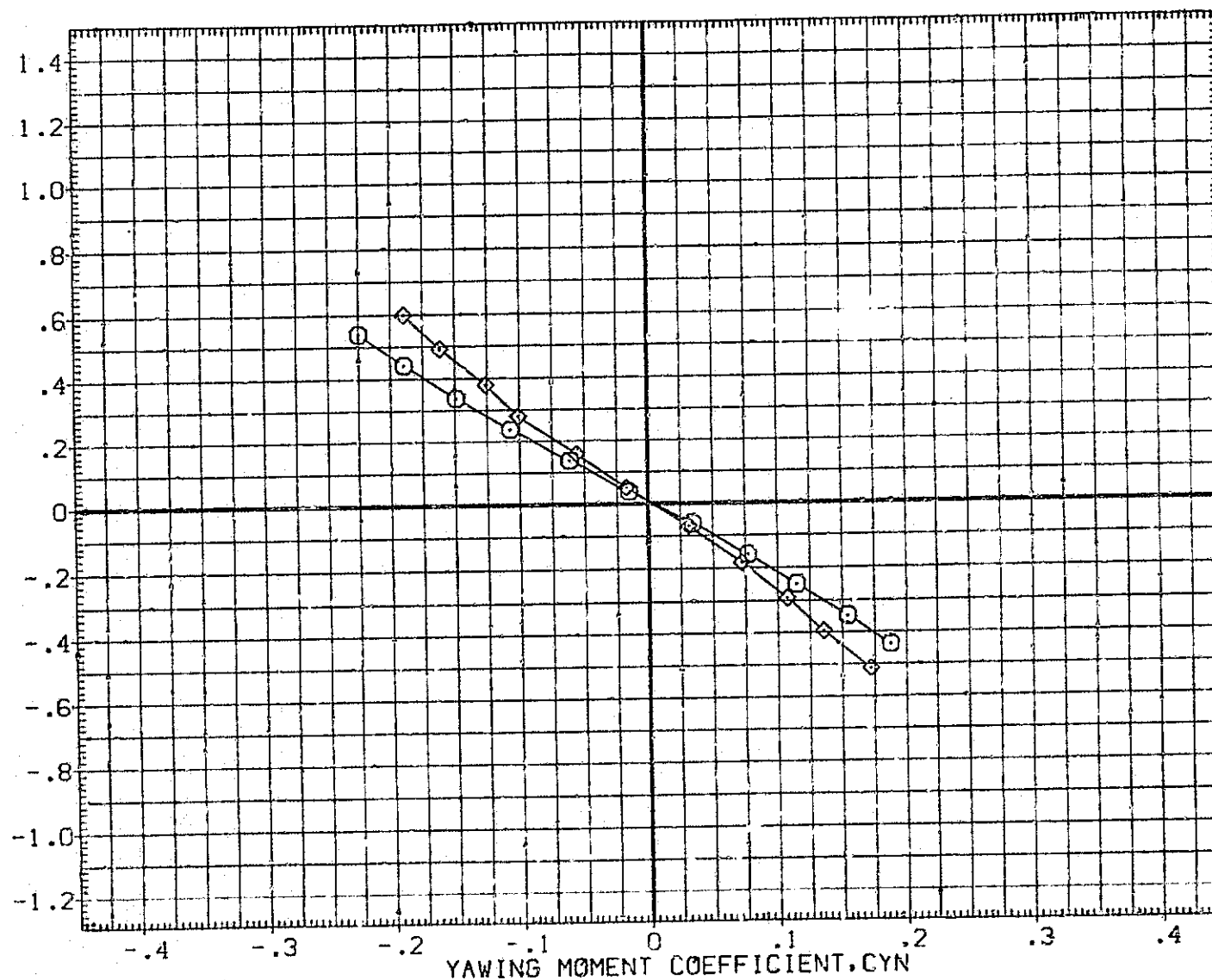


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(C)MACH = .90

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 591 (JA33) 740TS (TIPISIP201)	
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SRLF	2630.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

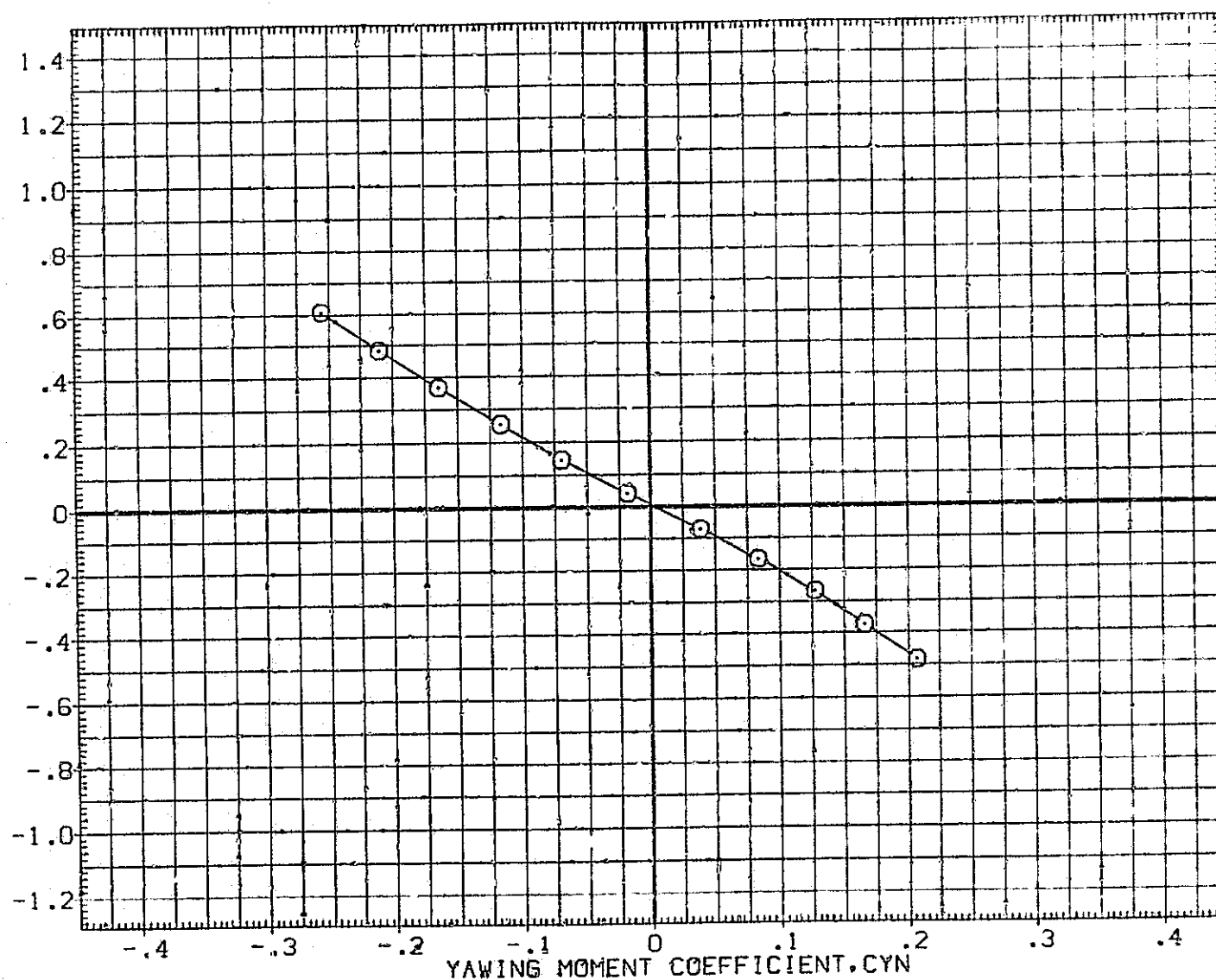


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	DRB STING
(A1C008)	MSFC 594(1A33) 740TS (T1P1S1P201)	DRB STING
(A1C036)	DATA NOT AVAILABLE	
(A1C022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	DRB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

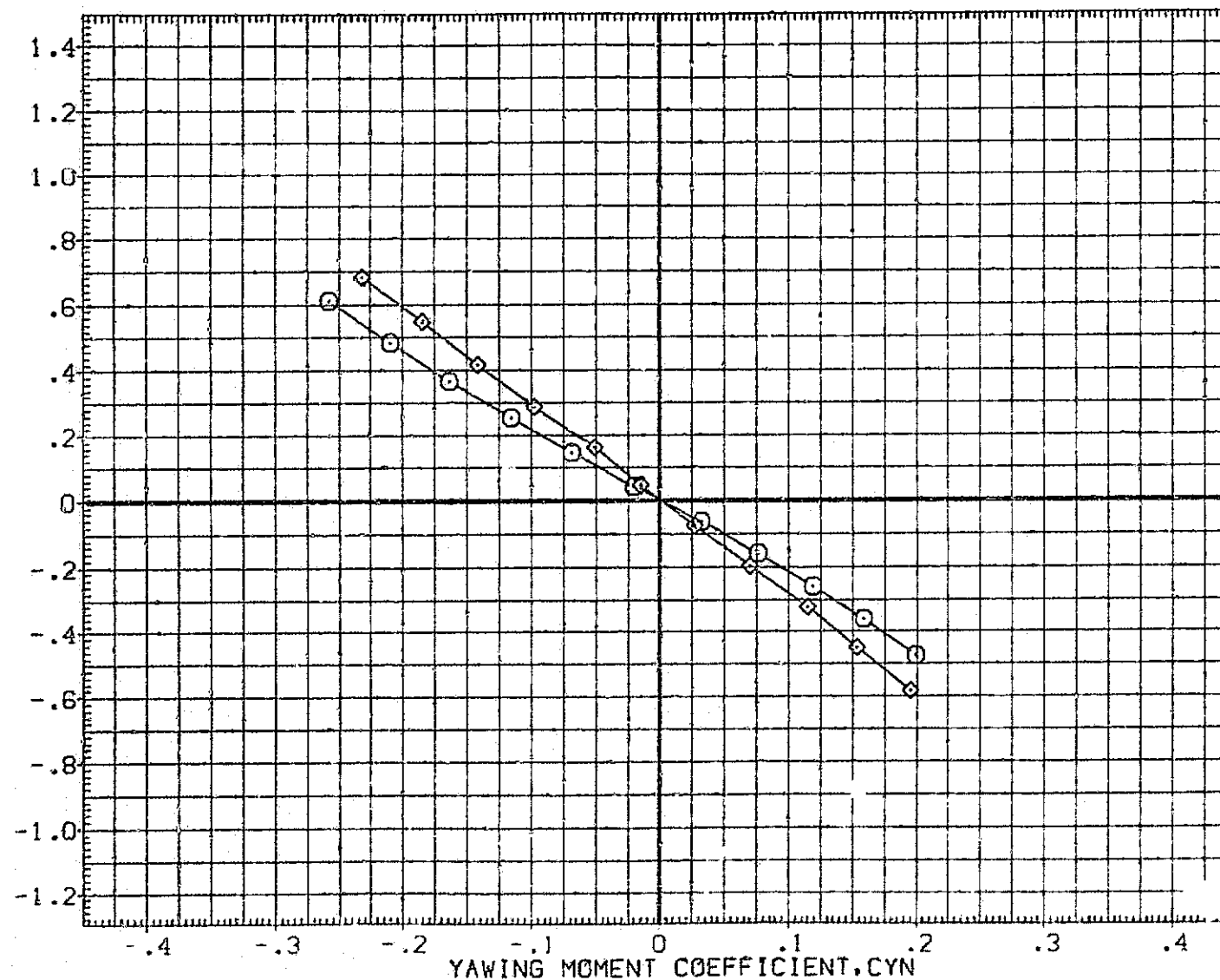


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORBIT STING
(AIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2680.0000	SQ. FT
LREF	1280.0000	IN.
BREF	1280.0000	IN.
AMRP	975.0000	IN. XT
YMPP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

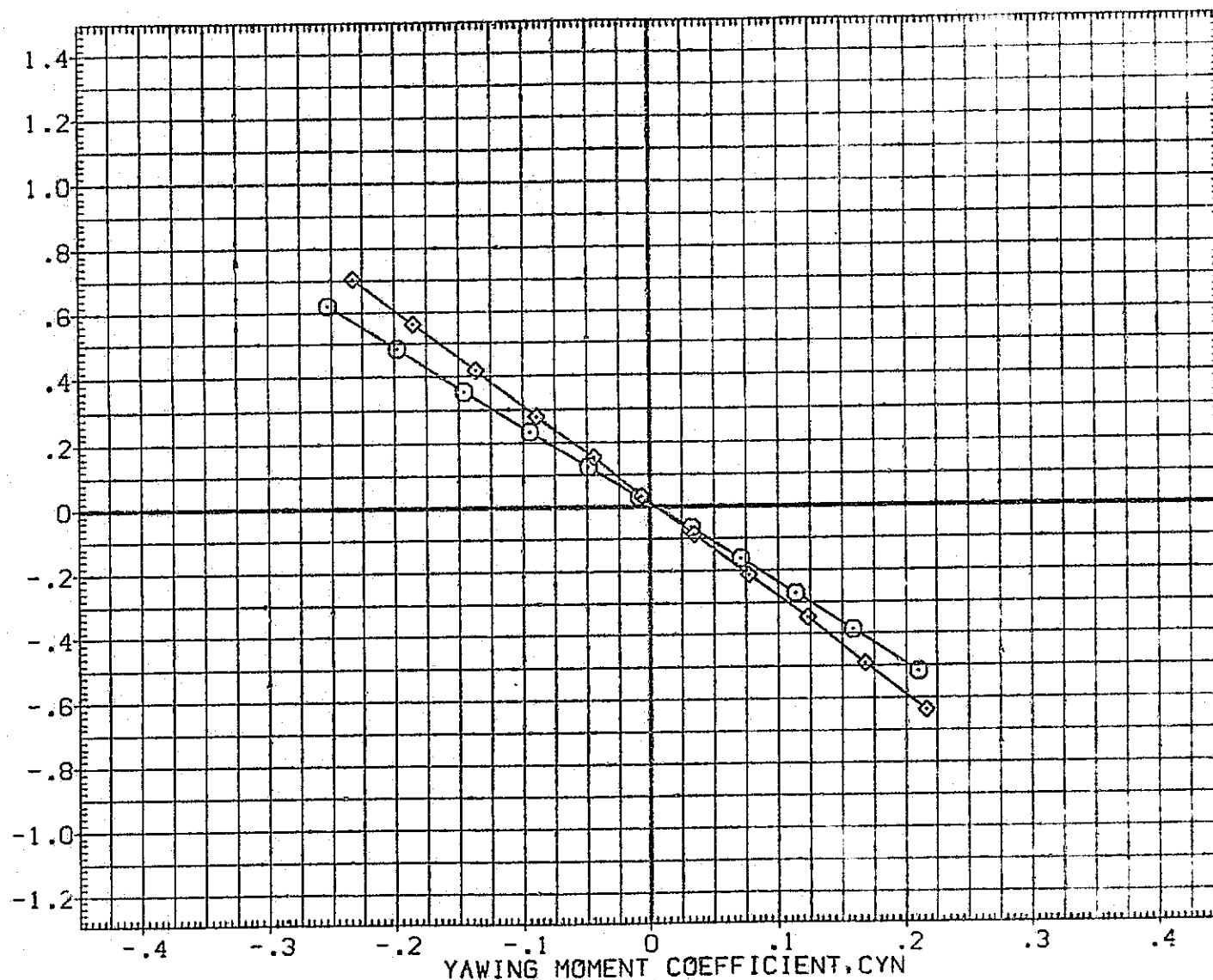


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(F)MACH = 1.25

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(A1C008)	MSFC 594(1A33) 740TS (TIPISIP201)	
(A1C036)	DATA NOT AVAILABLE	
(A1C022)	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

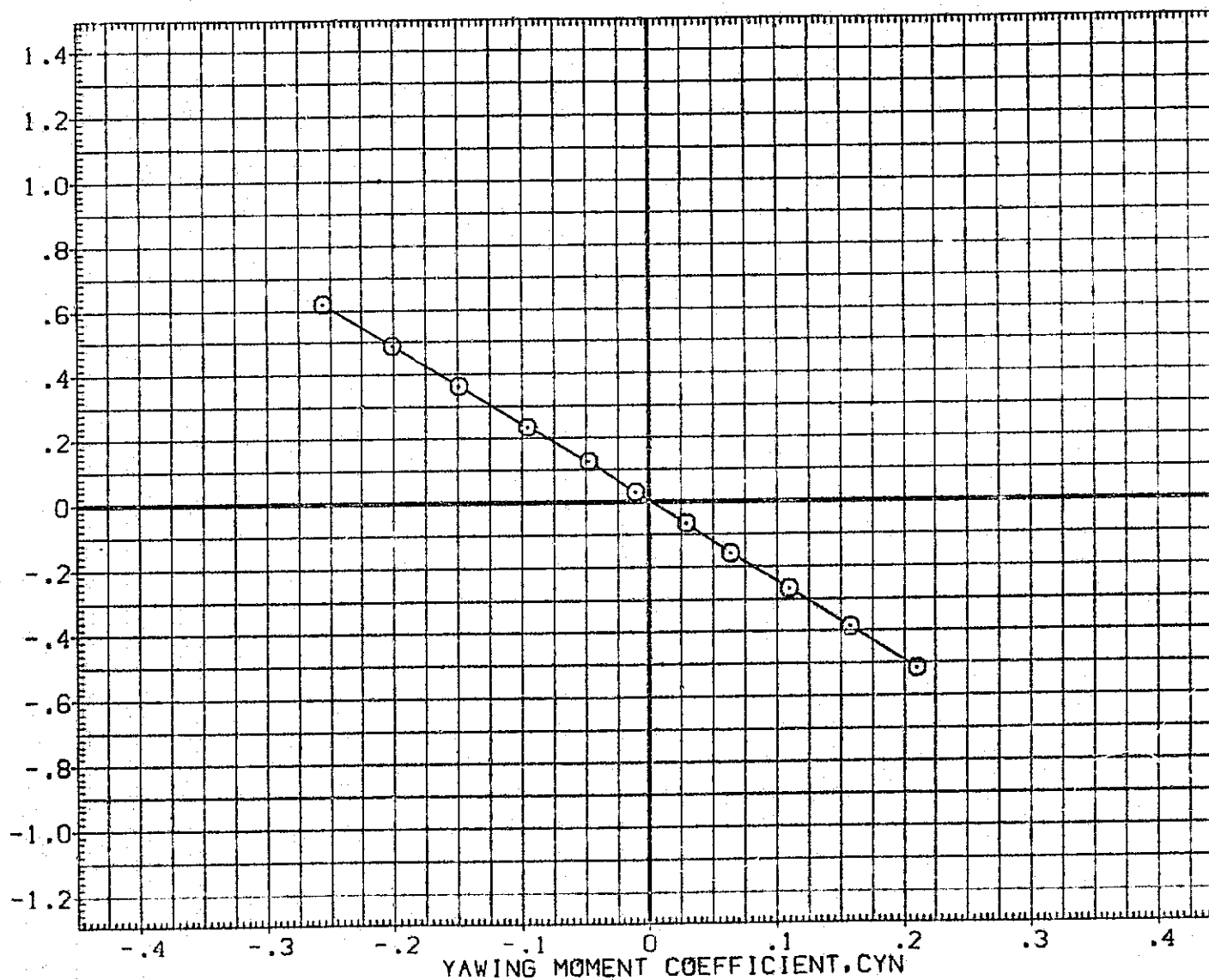


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (G)MACH = 1.47

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(AIC008)	MSFC 594(A33) 740TS (TIPISIP201)	ORB STING
(AIC036)	DATA NOT AVAILABLE	
(AIC022)	MSFC 594(A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

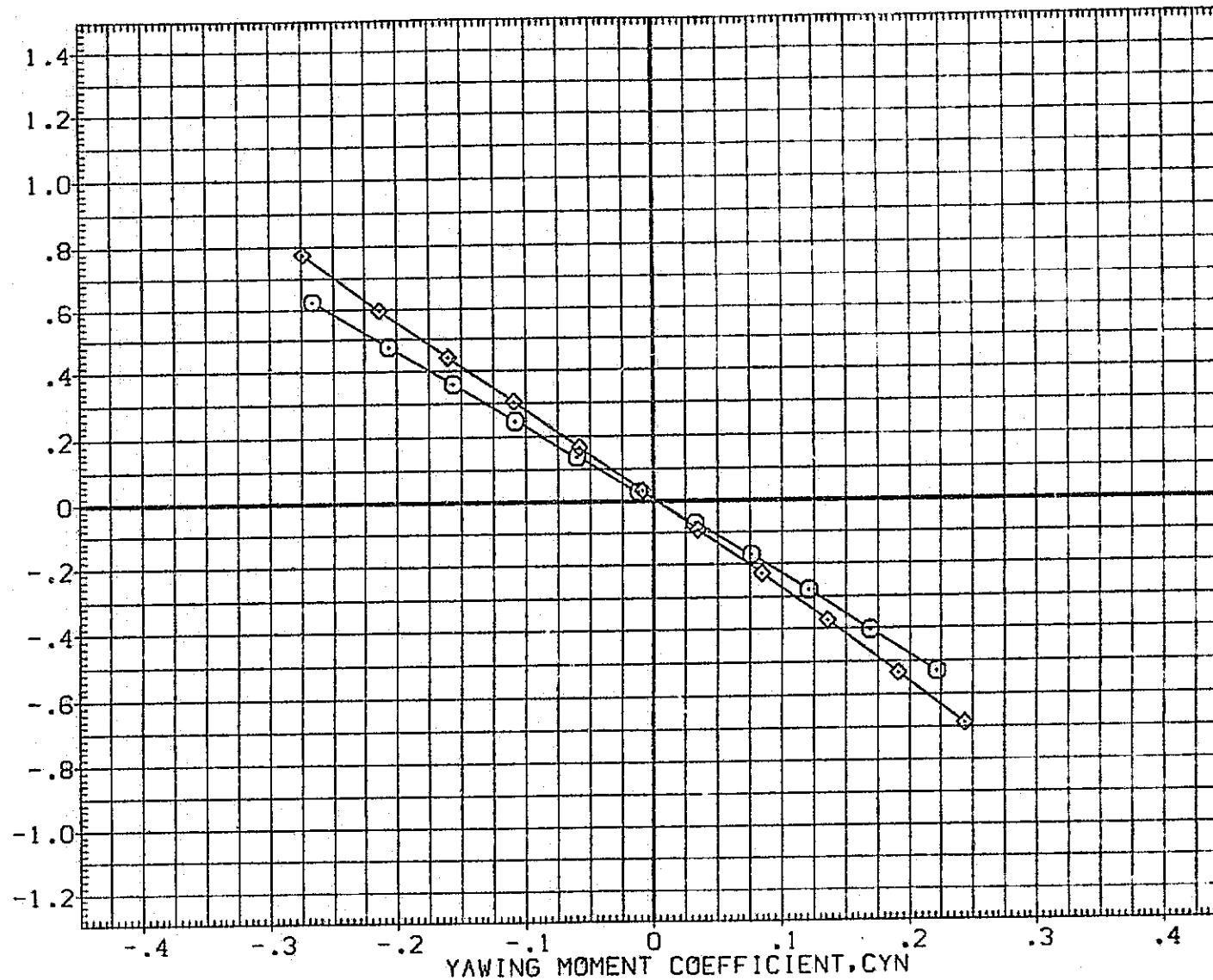


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(H)MACH = 1.97

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	DRB STING
[AIC008]	MSFC 594(JA33) 740TS (TIP)SIP201	
[AIC036]	DATA NOT AVAILABLE	
[AIC022]	DATA NOT AVAILABLE	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

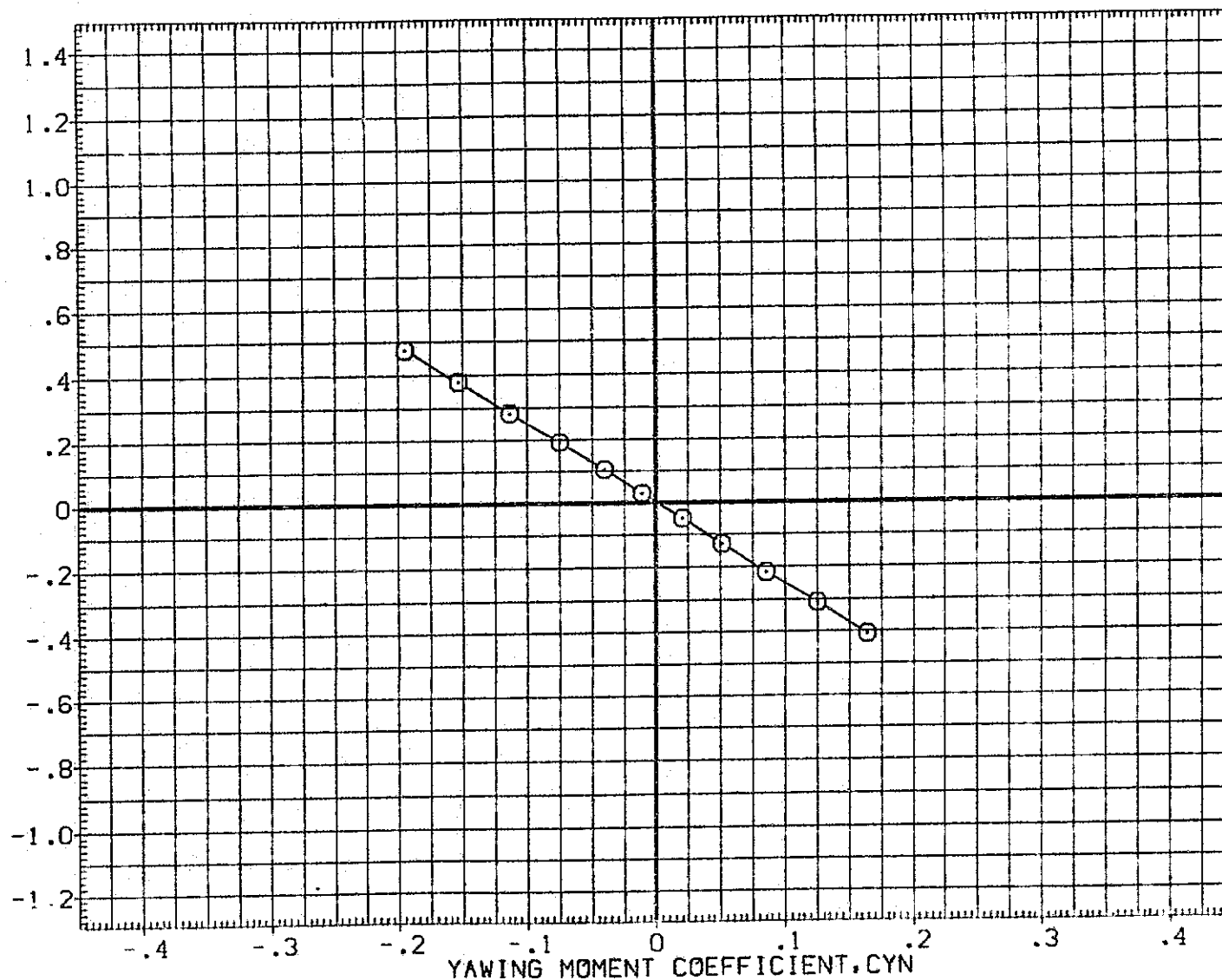


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (1)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(A1C008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(A1C036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(A1C022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2620.0000	SL. FT
LREF	1240.0000	IN.
BREF	1290.0000	IN.
XMSP	976.0000	IN. XT
YMSP	.0000	IN. YT
ZMSP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

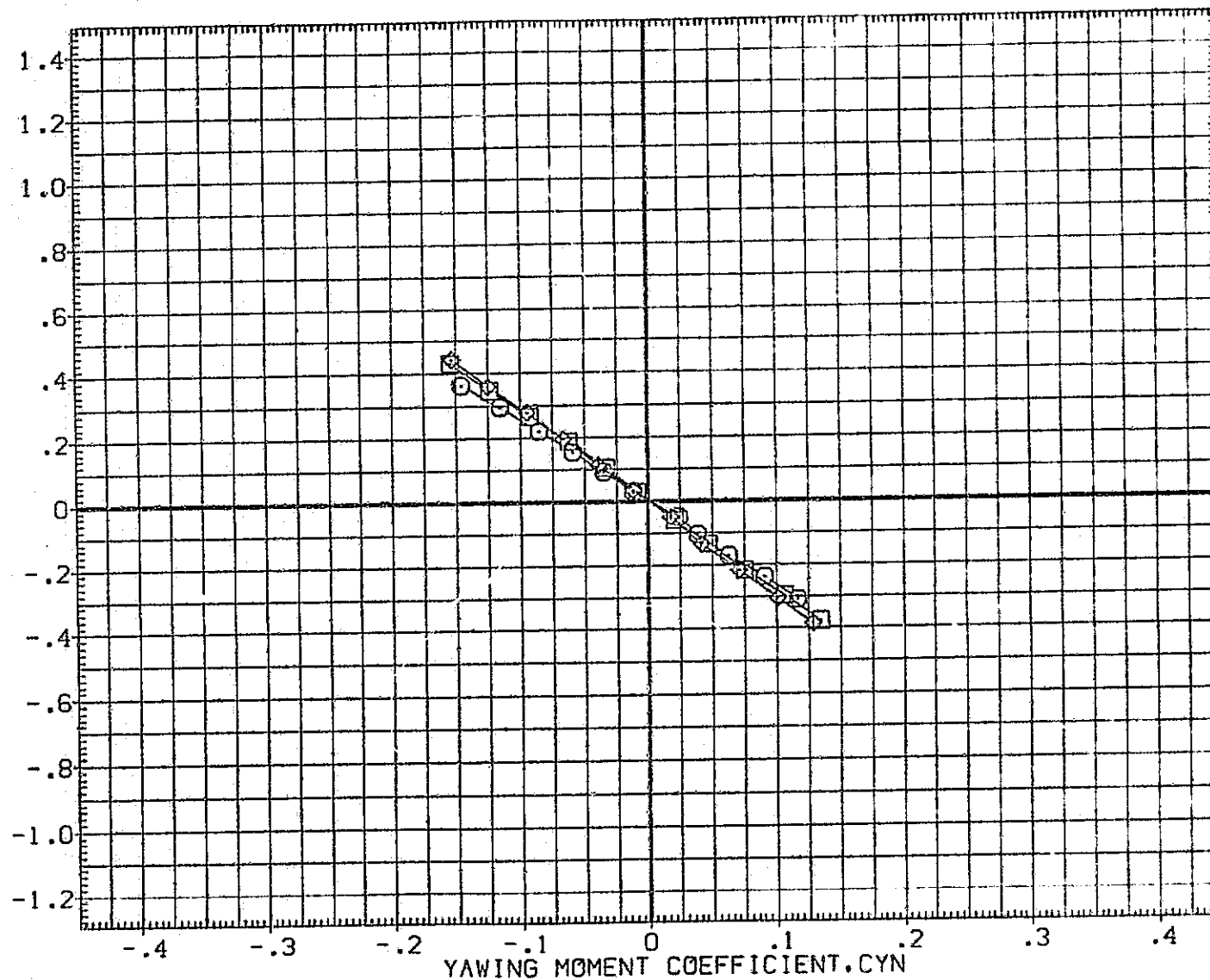


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING
(VIC036)	MSFC 594(1A33) 740TS (TIPISIP201F2)	ORB STING
(VIC022)	MSFC 594(1A33) 740TS (T2PISIP201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2653.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

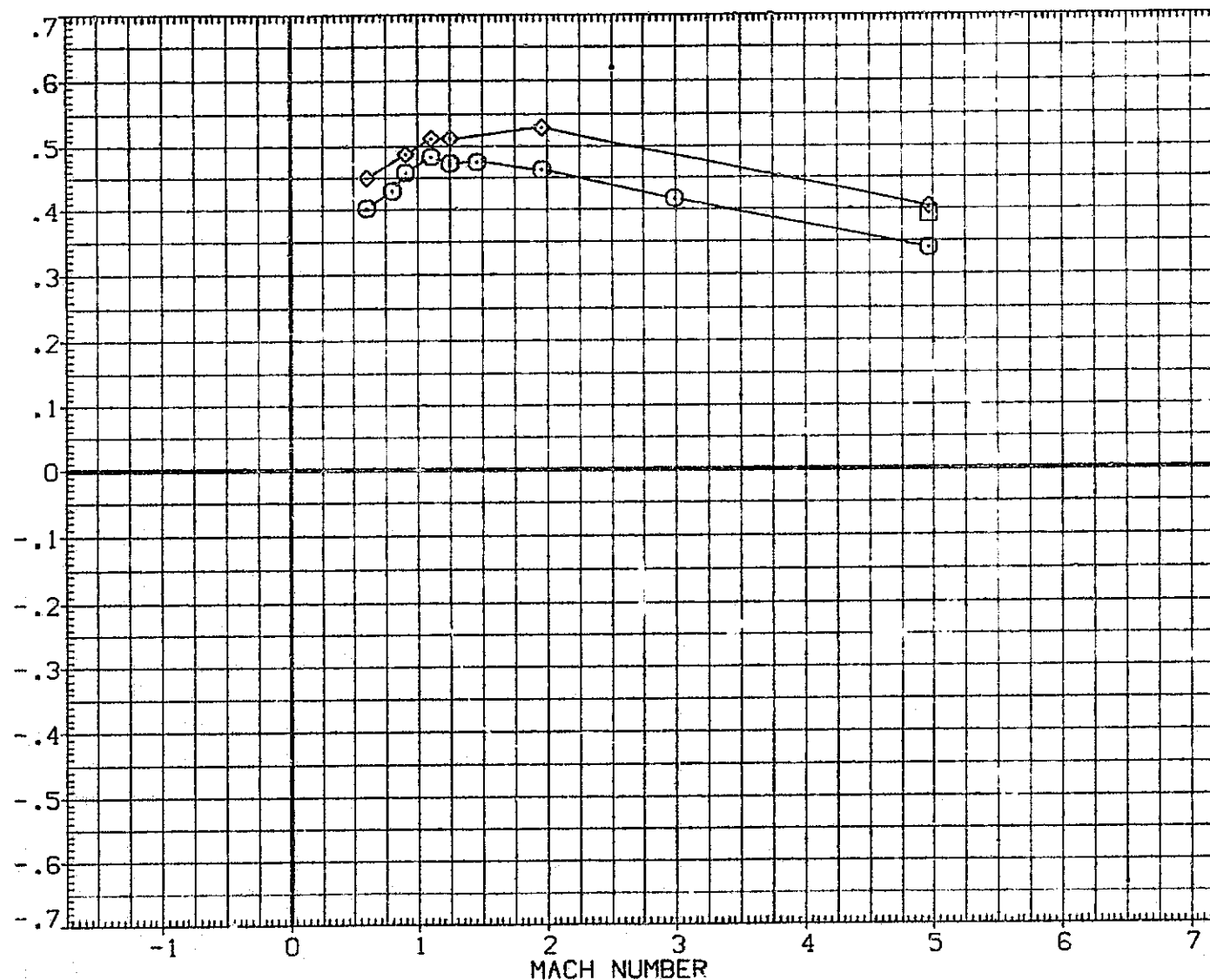


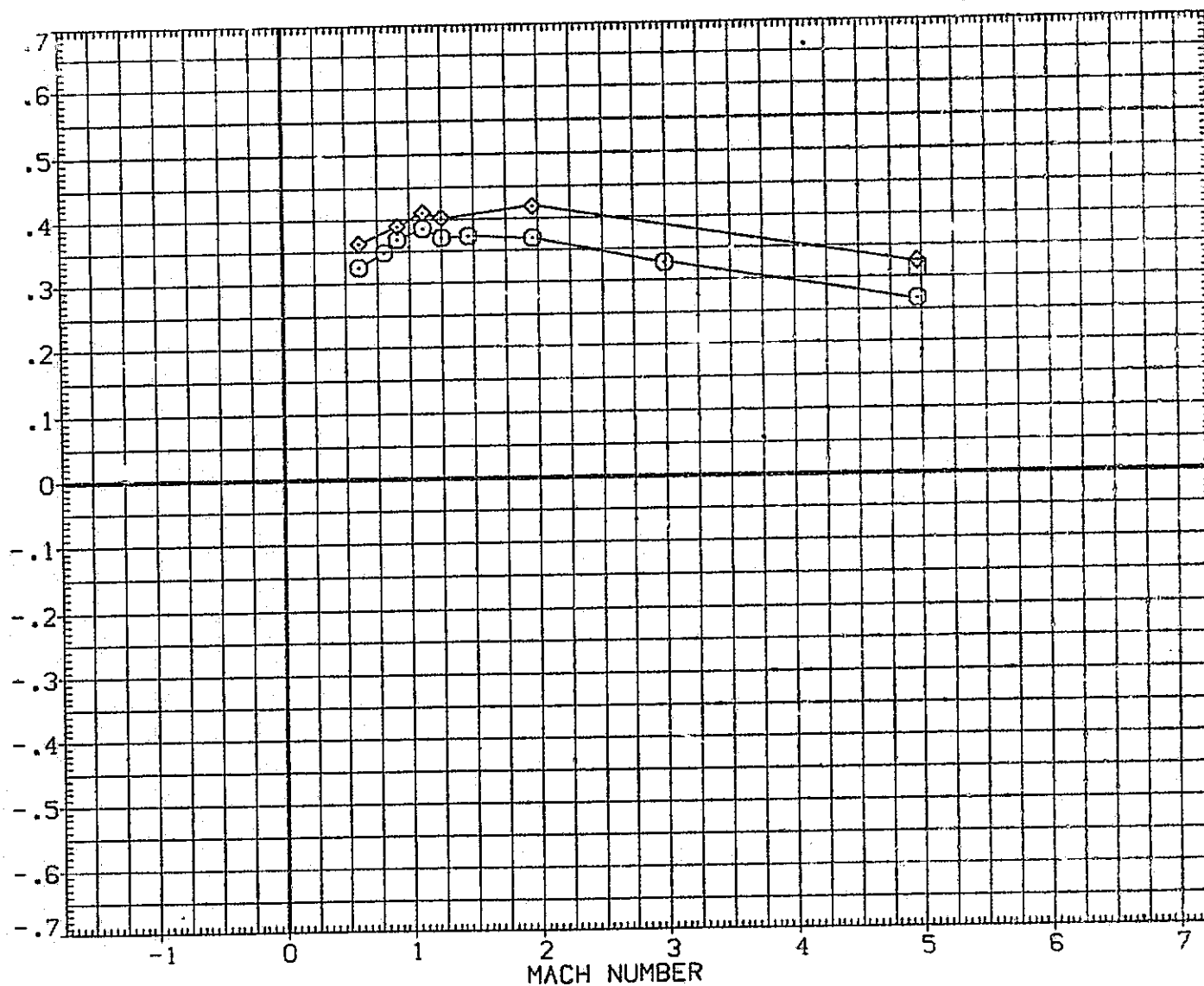
FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO

(A) BETA = -10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594 (A33) 740TS (TIPISIP201)	ORB STING
(VIC036)	MSFC 594 (A33) 740TS (TIPIS3P201F2)	ORB STING
(VIC022)	MSFC 594 (A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY



DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

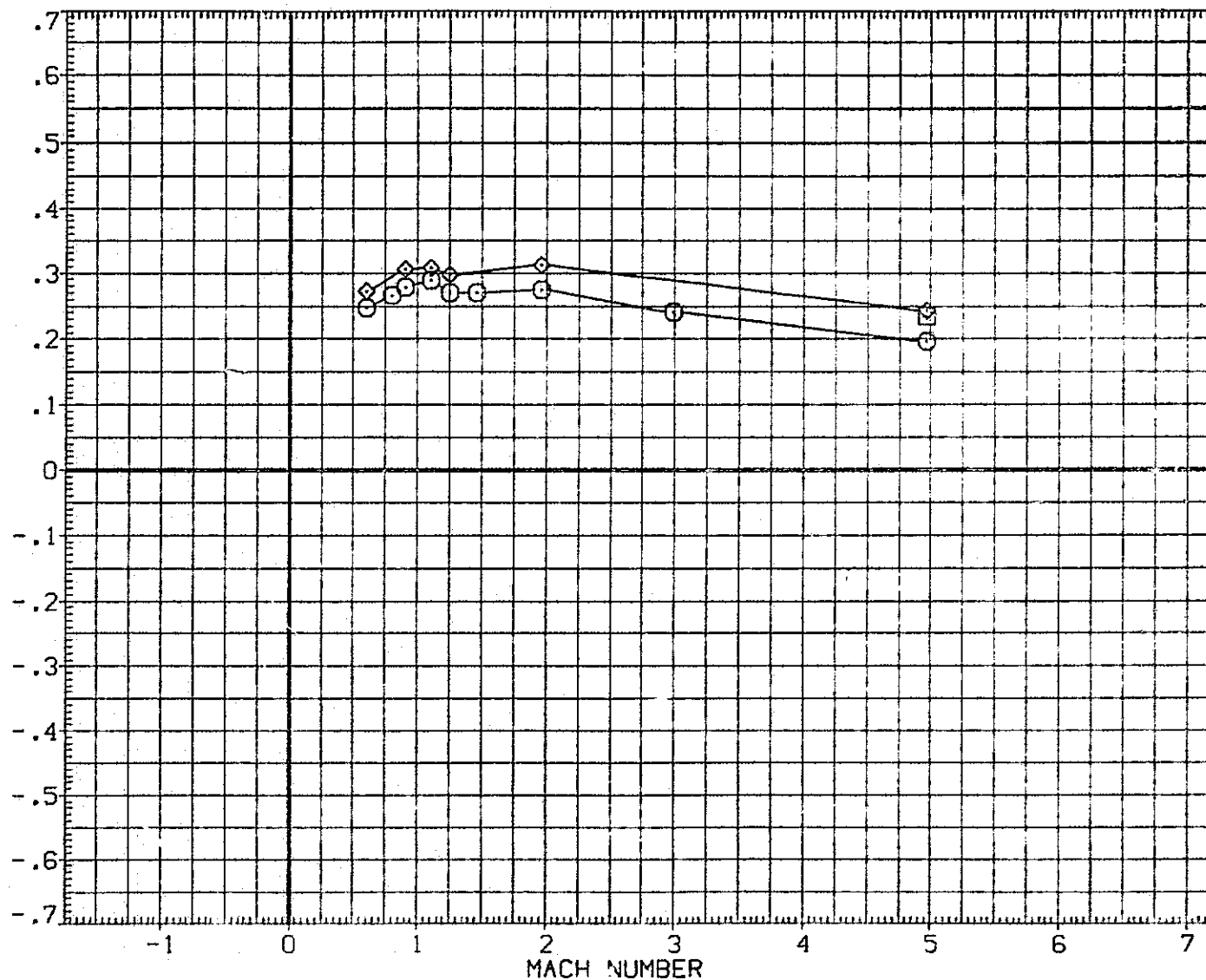


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (C)BETA = -6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594 (A33) 740TS (TIPIS1P201)	ORB STING
(VIC036)	MSFC 594 (A33) 740TS (TIPIS3P201F2)	ORB STING
(VIC022)	MSFC 594 (A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

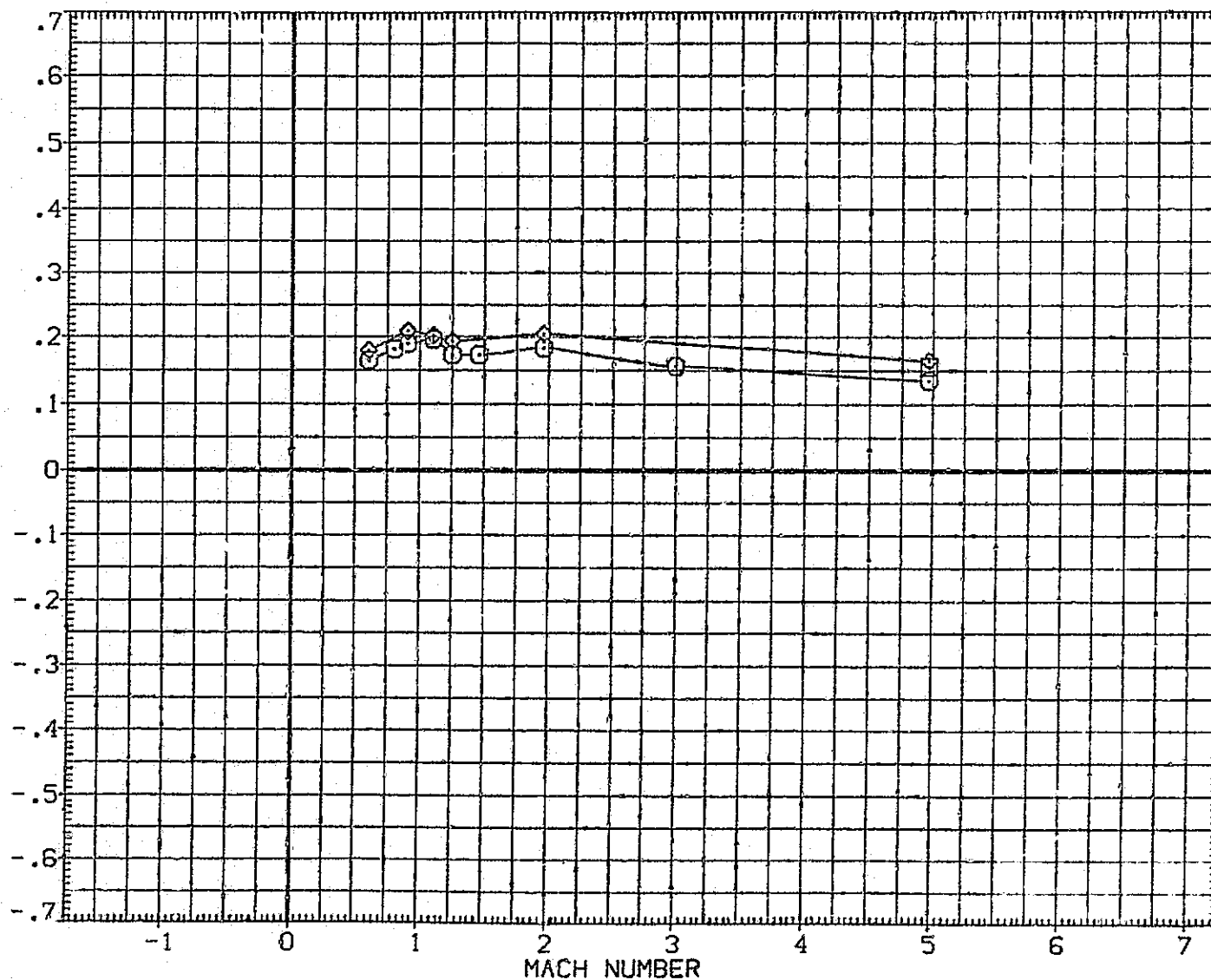


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(DJ)BETA = -4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

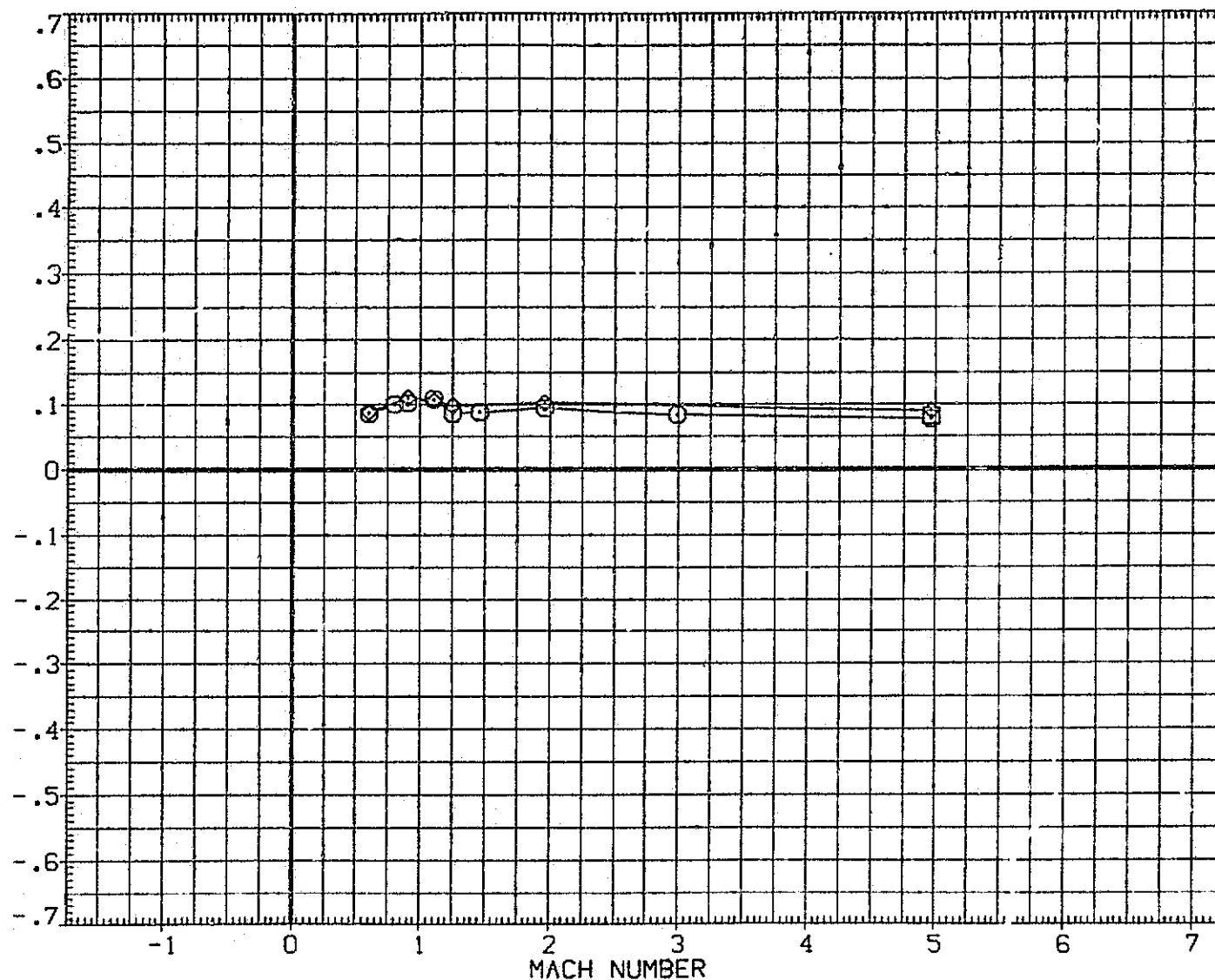


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (E)BETA = -2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

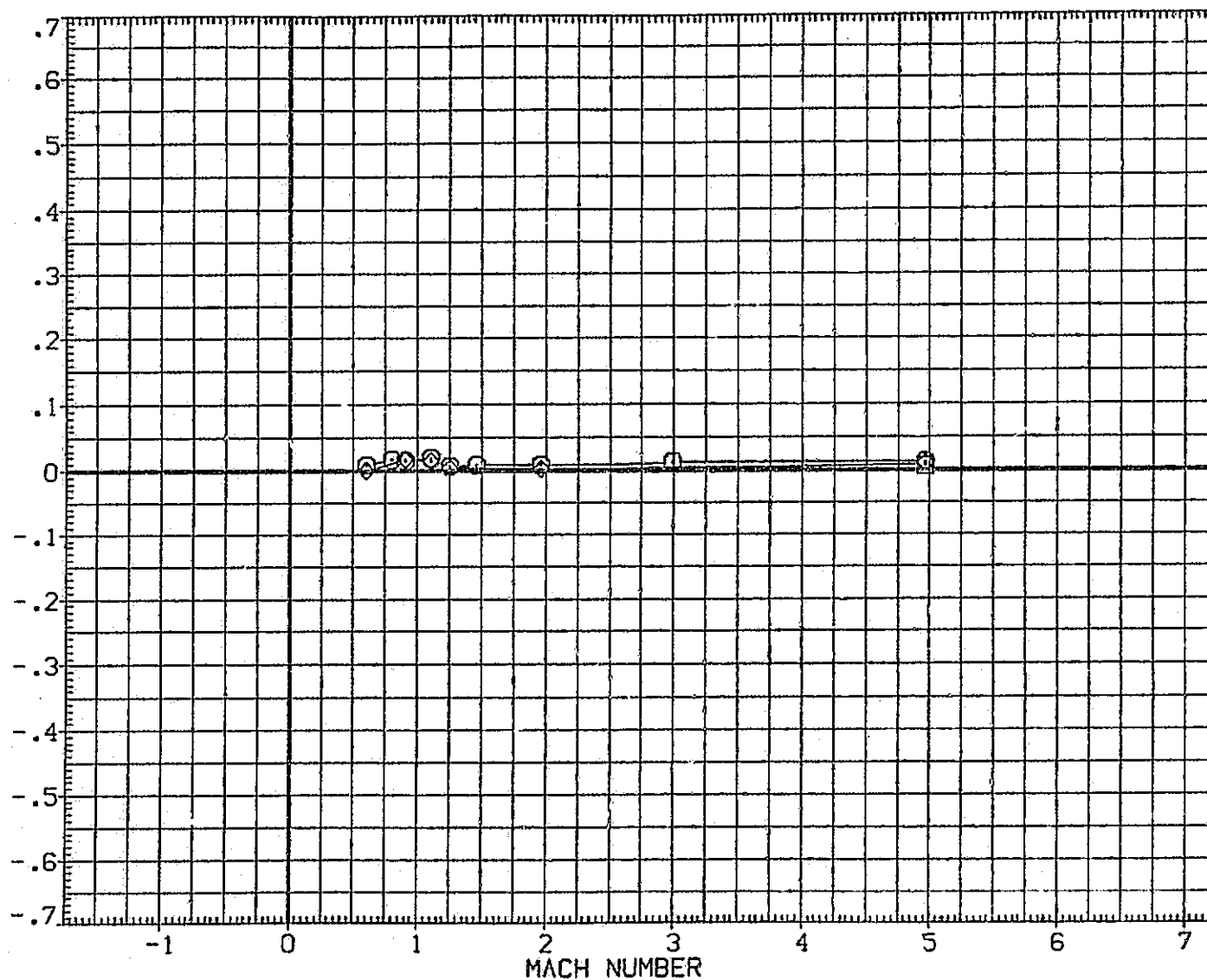


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(F)BETA = .00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC S94(1A33) 740TS (TIP1S1P201)	ORB STING
(VIC036)	MSFC S94(1A33) 740TS (TIP1S3P201F2)	ORB STING
(VIC022)	MSFC S94(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

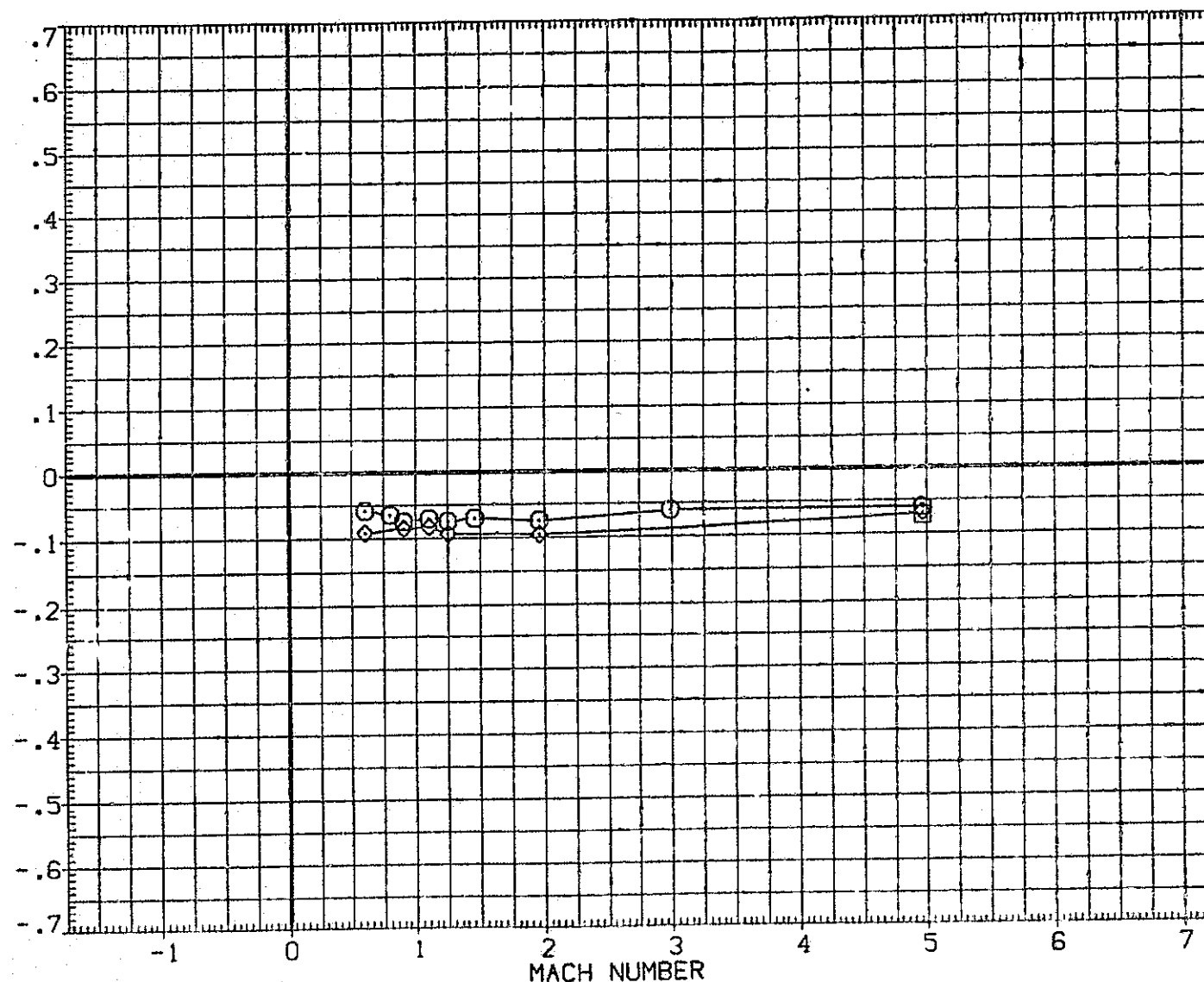


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(G)BETA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(IA33) 740TS (T1P1S1P201)	ORB STING
(VIC036)	MSFC 594(IA33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022)	MSFC 594(IA33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

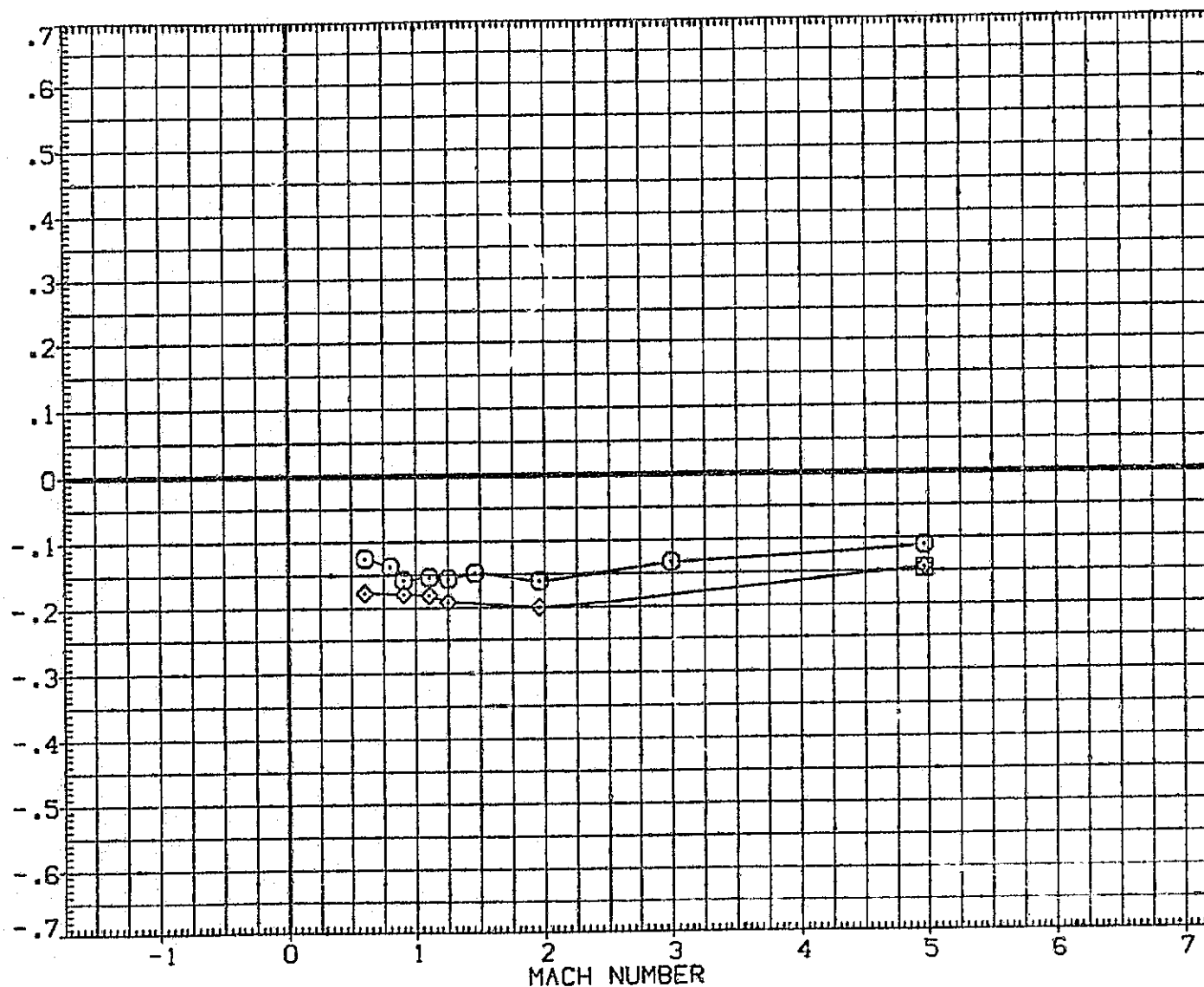


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(H)BETA = 4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

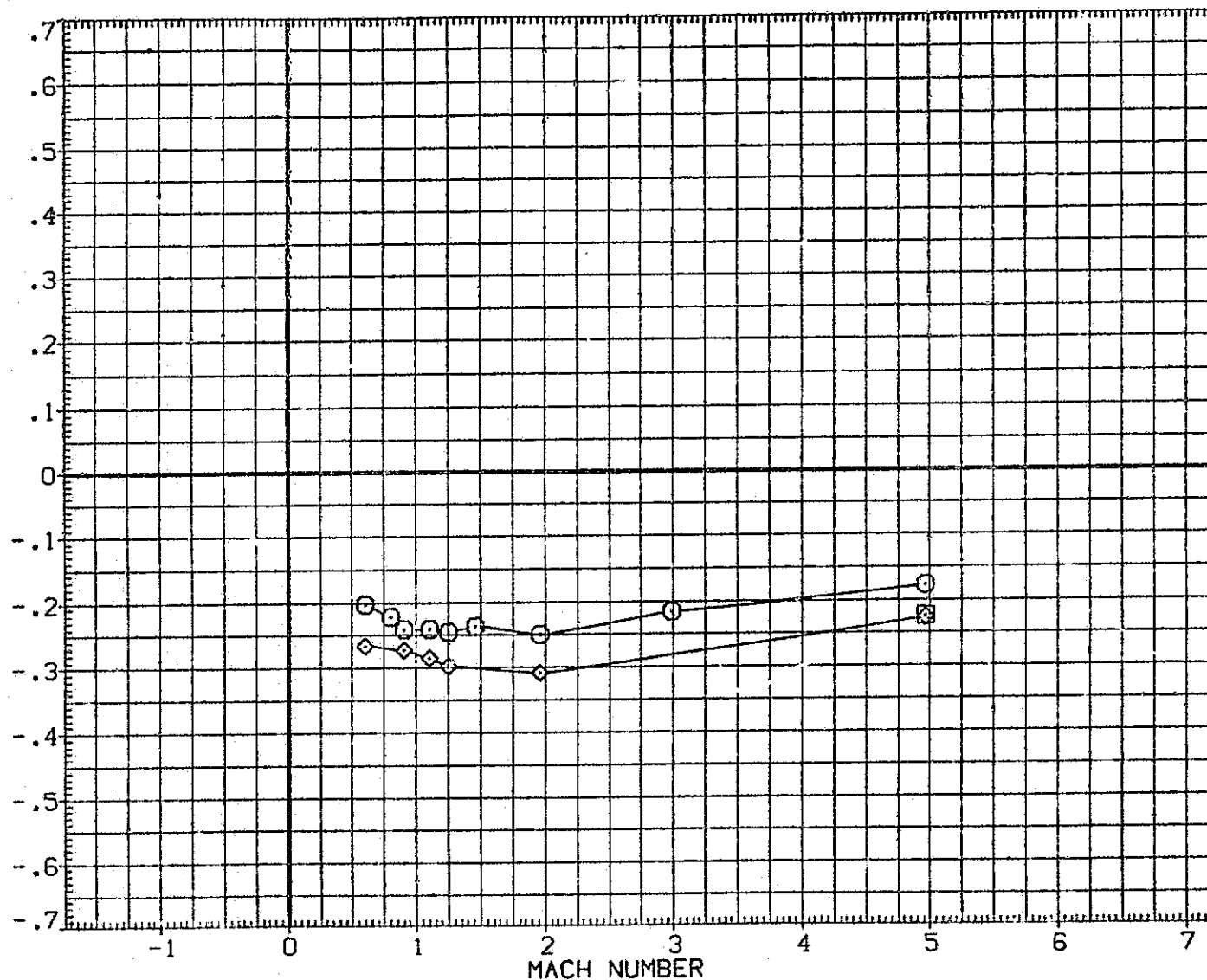


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (1) BETA = 6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008) ○	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC036) ○	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022) ◇	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

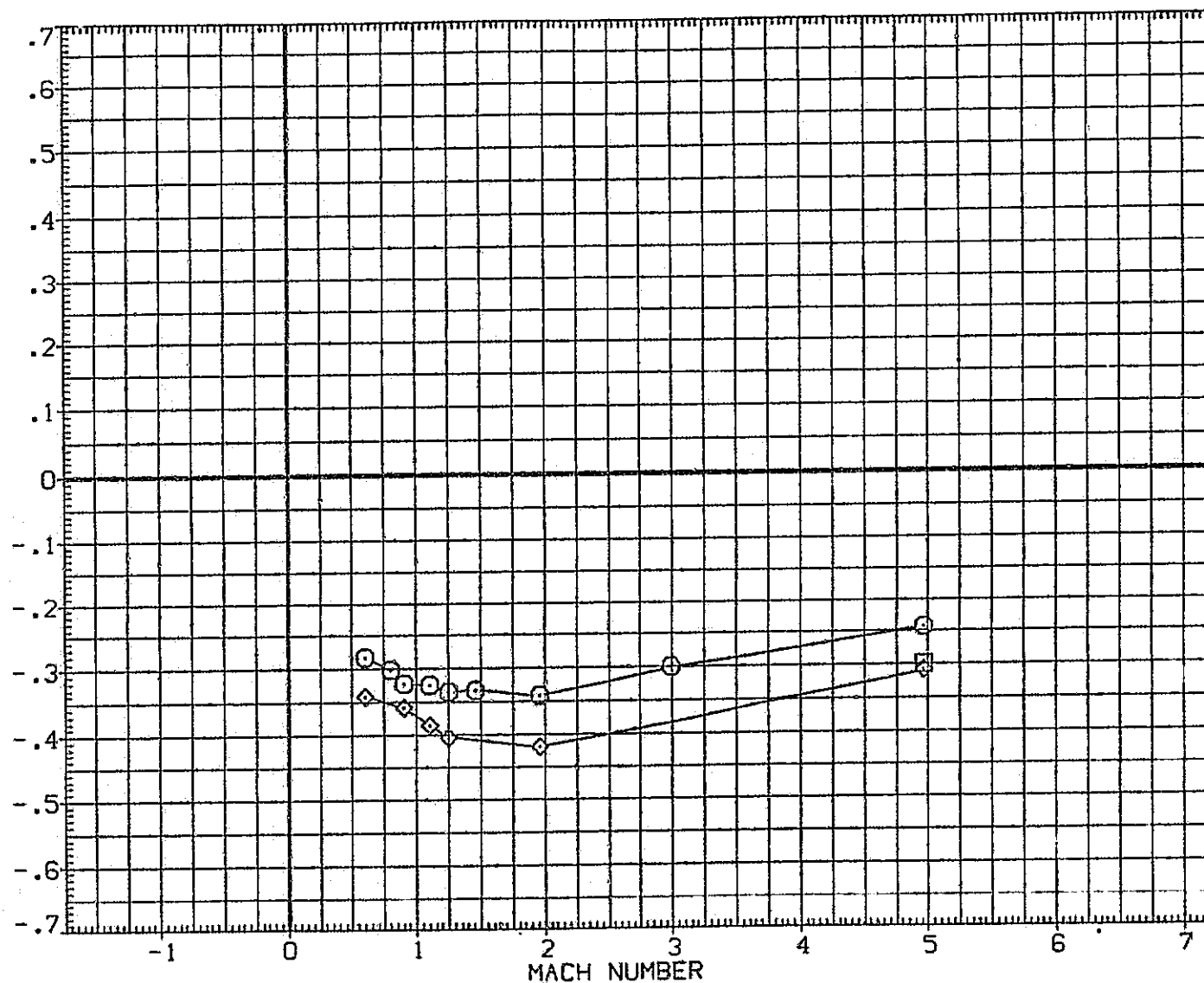


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(J)BETA = 8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

SIDE-FORCE COEFFICIENT, CY

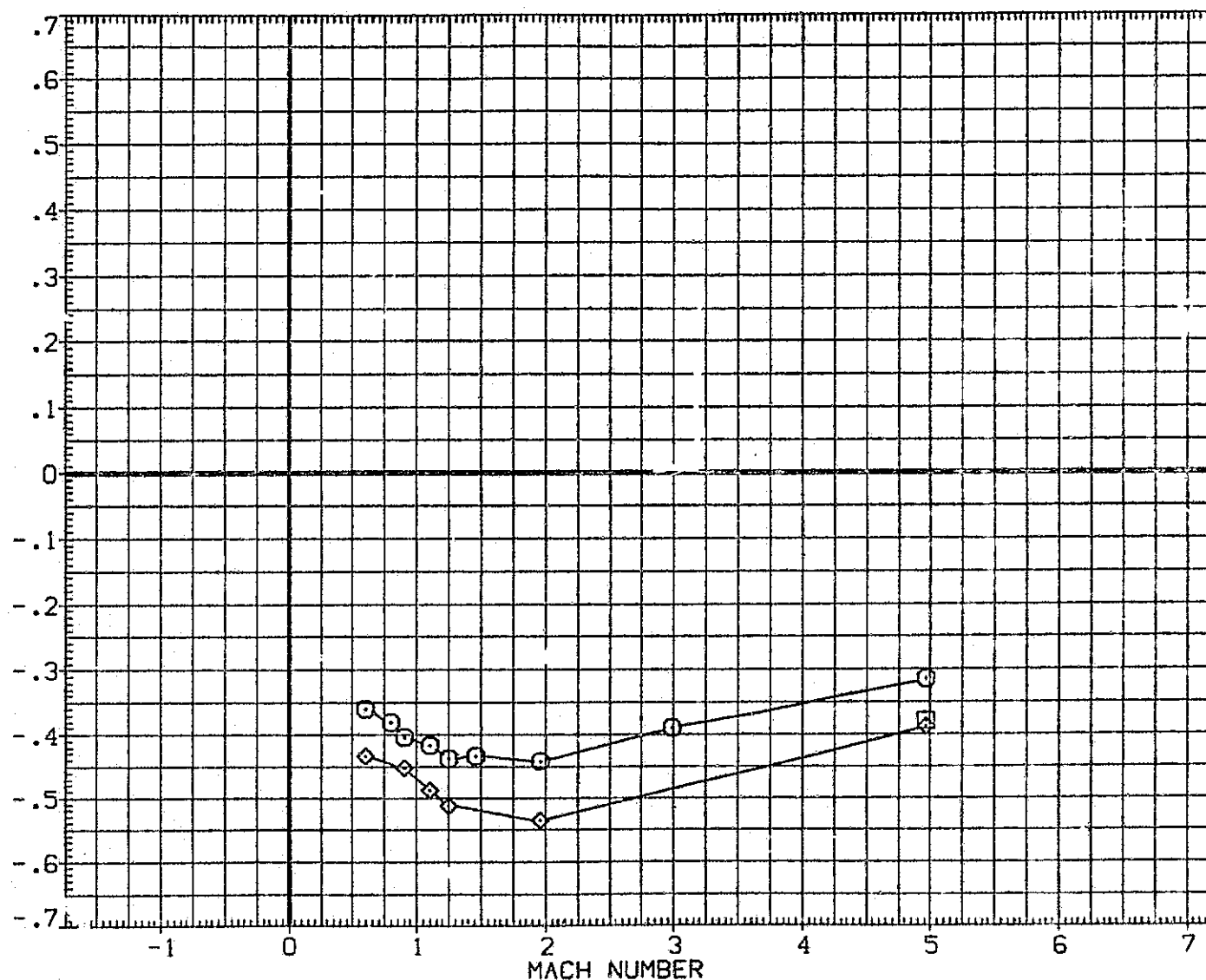


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(K)BETA = 10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
{VIC008}	MSFC 594(1A33) 740TS (TIPIS1P201)	ORB STING
{VIC036}	MSFC 594(1A33) 740TS (TIPIS3P201F2)	ORB STING
{VIC022}	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

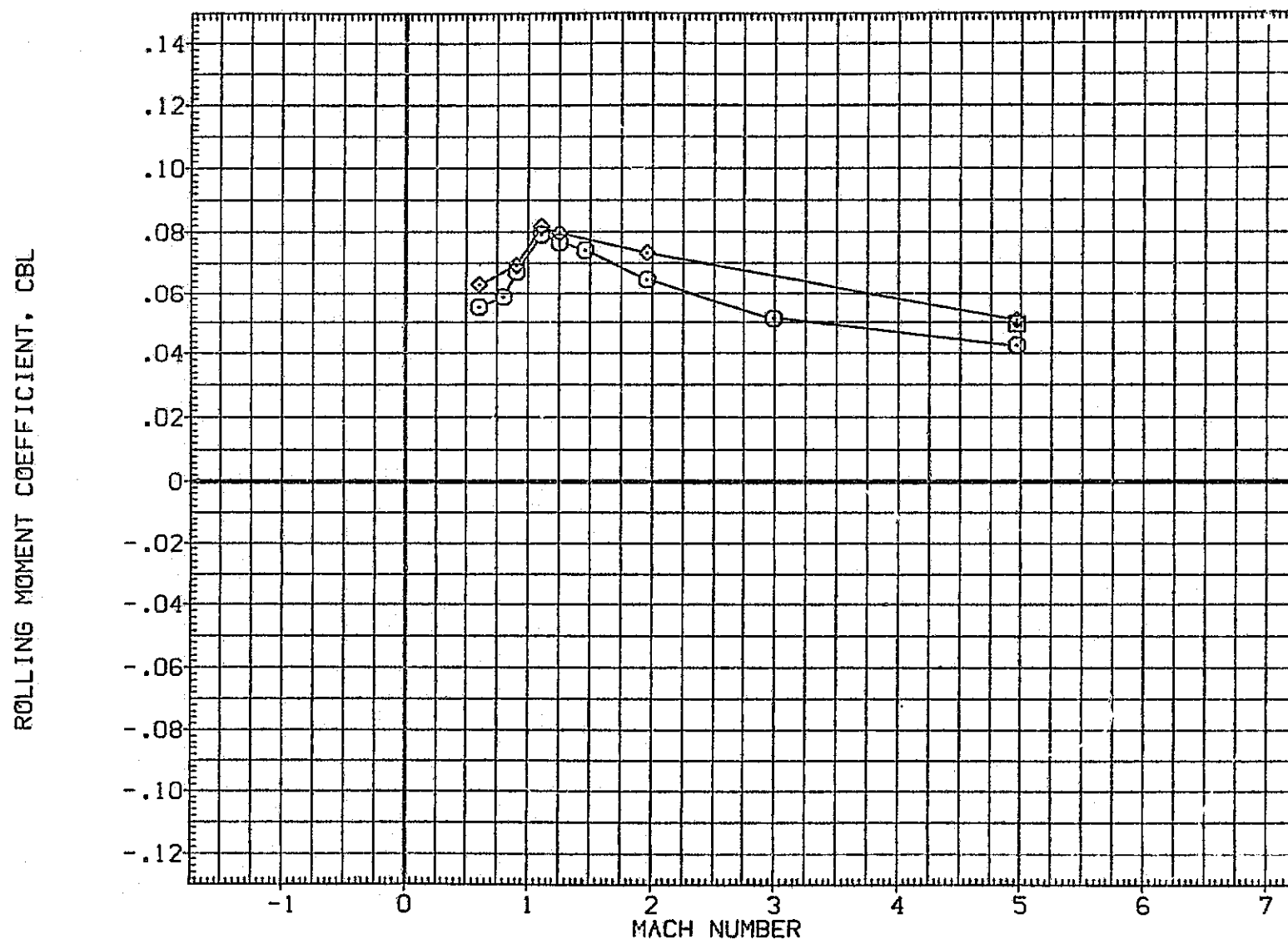


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO

(A) BETA = -10.00

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DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

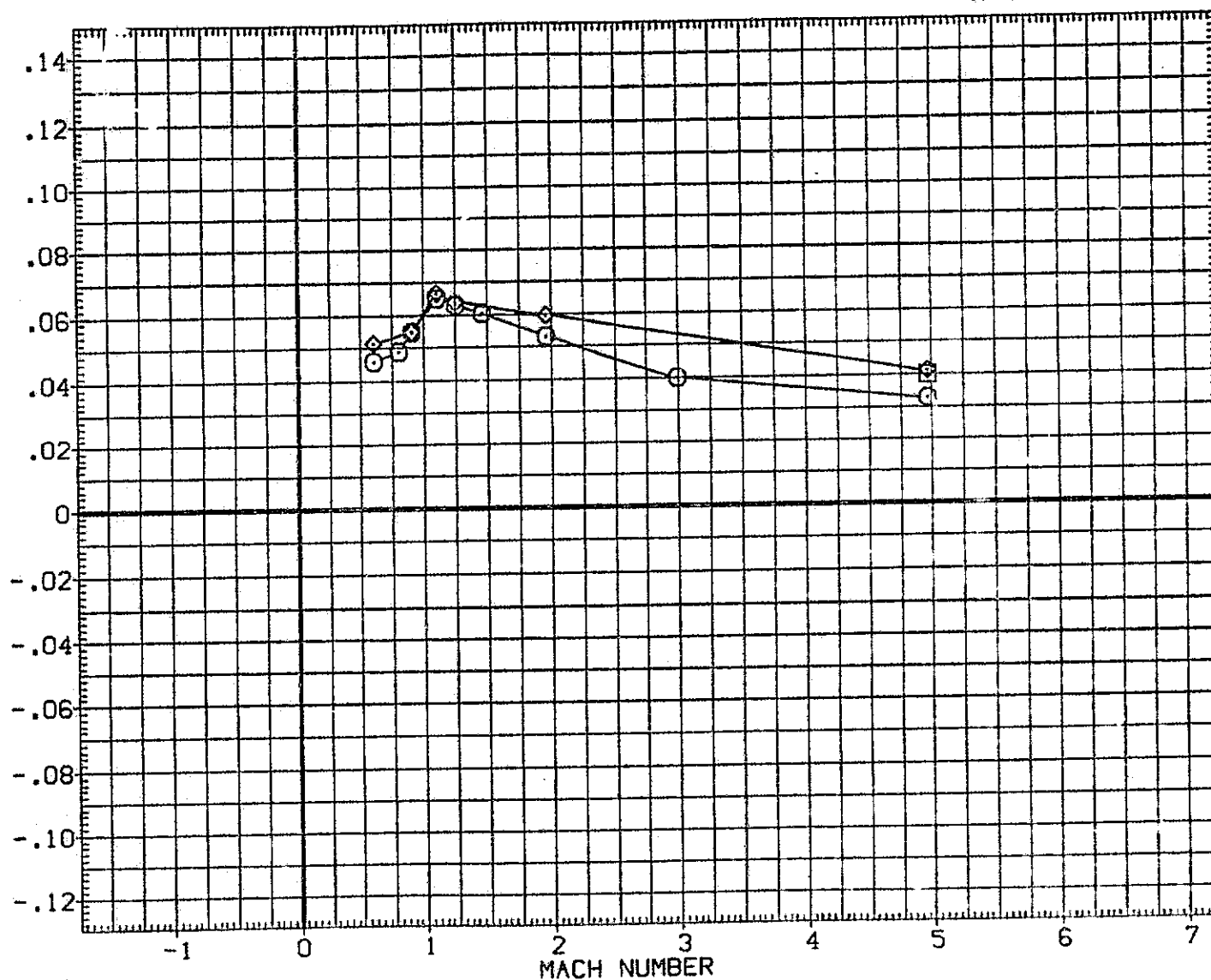


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(B)BETA = -8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

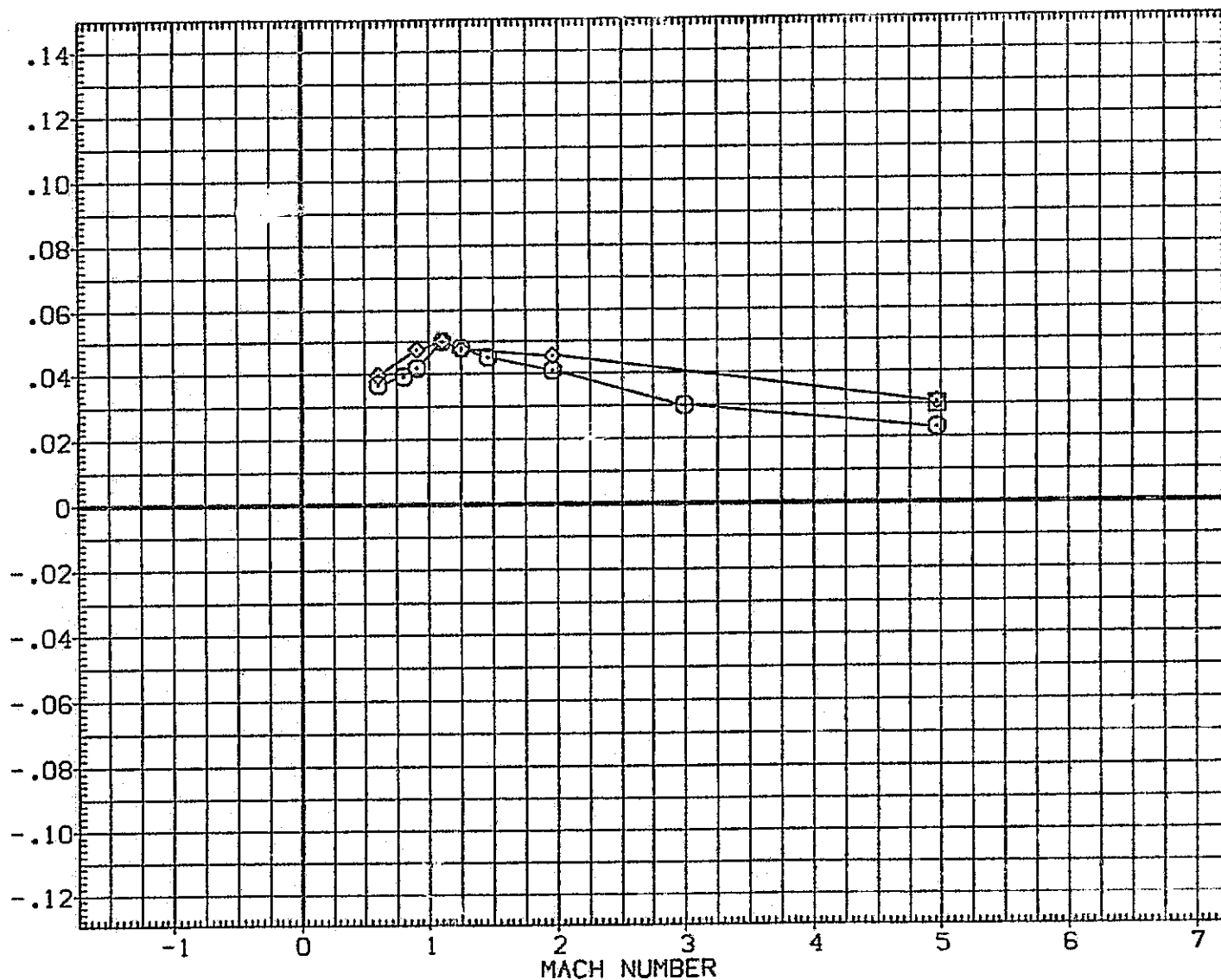


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(C)BETA = -6.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC008)	□	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC036)	□	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022)	◇	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION

SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

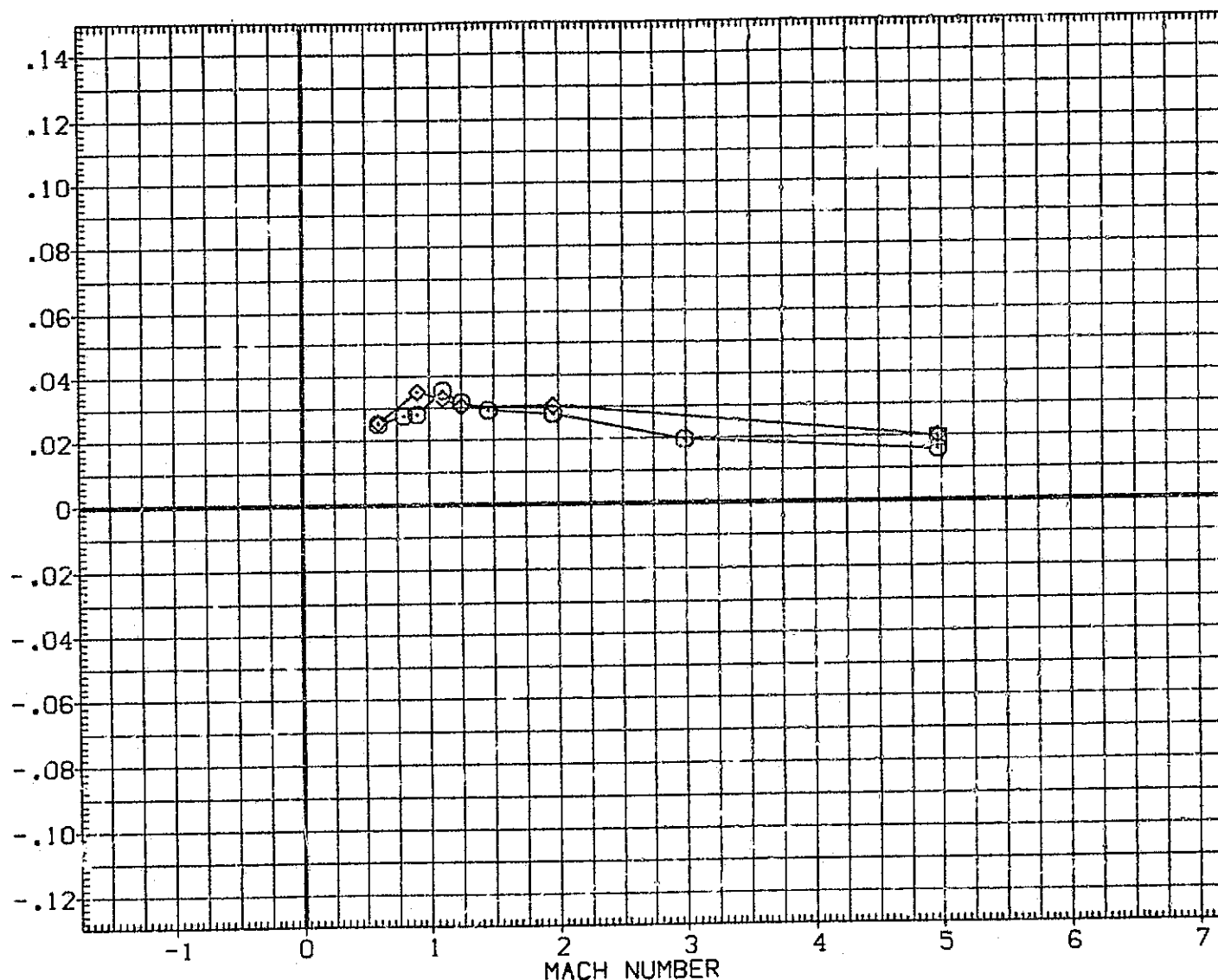


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO

(D)BETA = -4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	DRB STING
(VIC008)	MSFC S94(A33) 740TS (T1P1S1P201)	DRB STING
(VIC036)	MSFC S94(A33) 740TS (T1P1S3P201F2)	DRB STING
(VIC022)	MSFC S94(A33) 740TS (T2P1S3P201F2)	DRB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

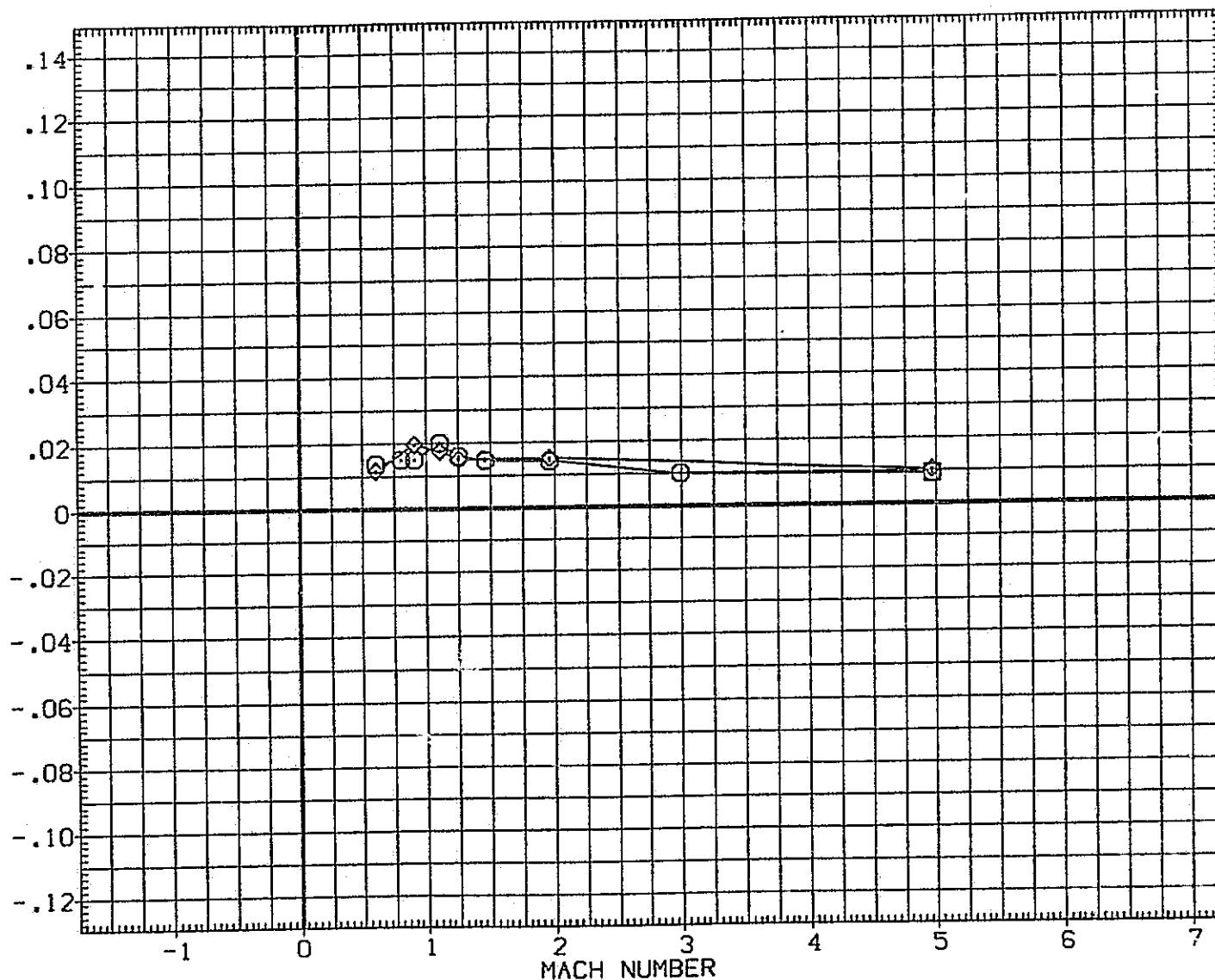


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(E)BETA = -2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(1A33) 740TS (TIPIS1P201)	ORB STING
(VIC036)	MSFC 594(1A33) 740TS (TIPIS3P201F2)	ORB STING
(VIC022)	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

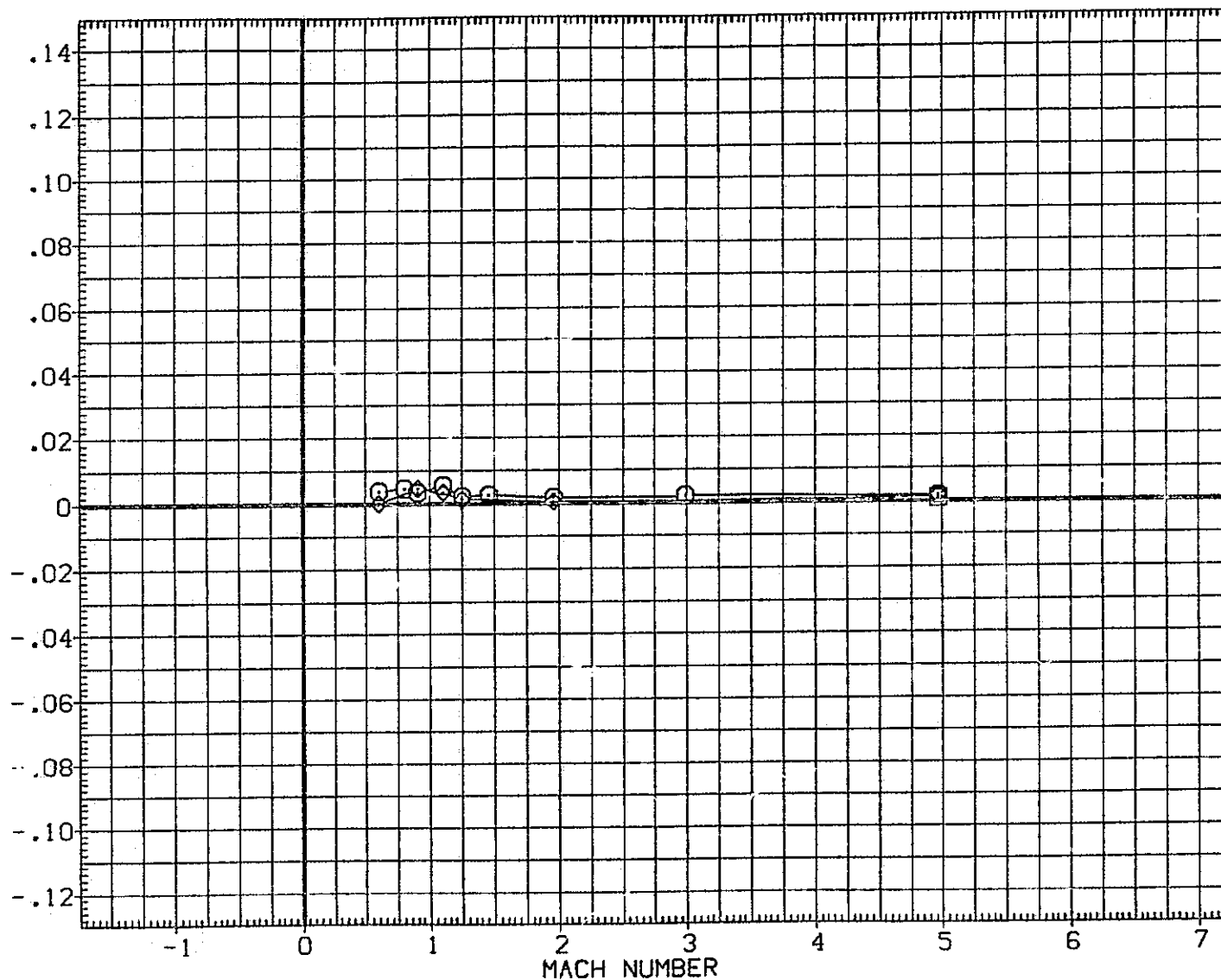


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(F)BETA = .00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

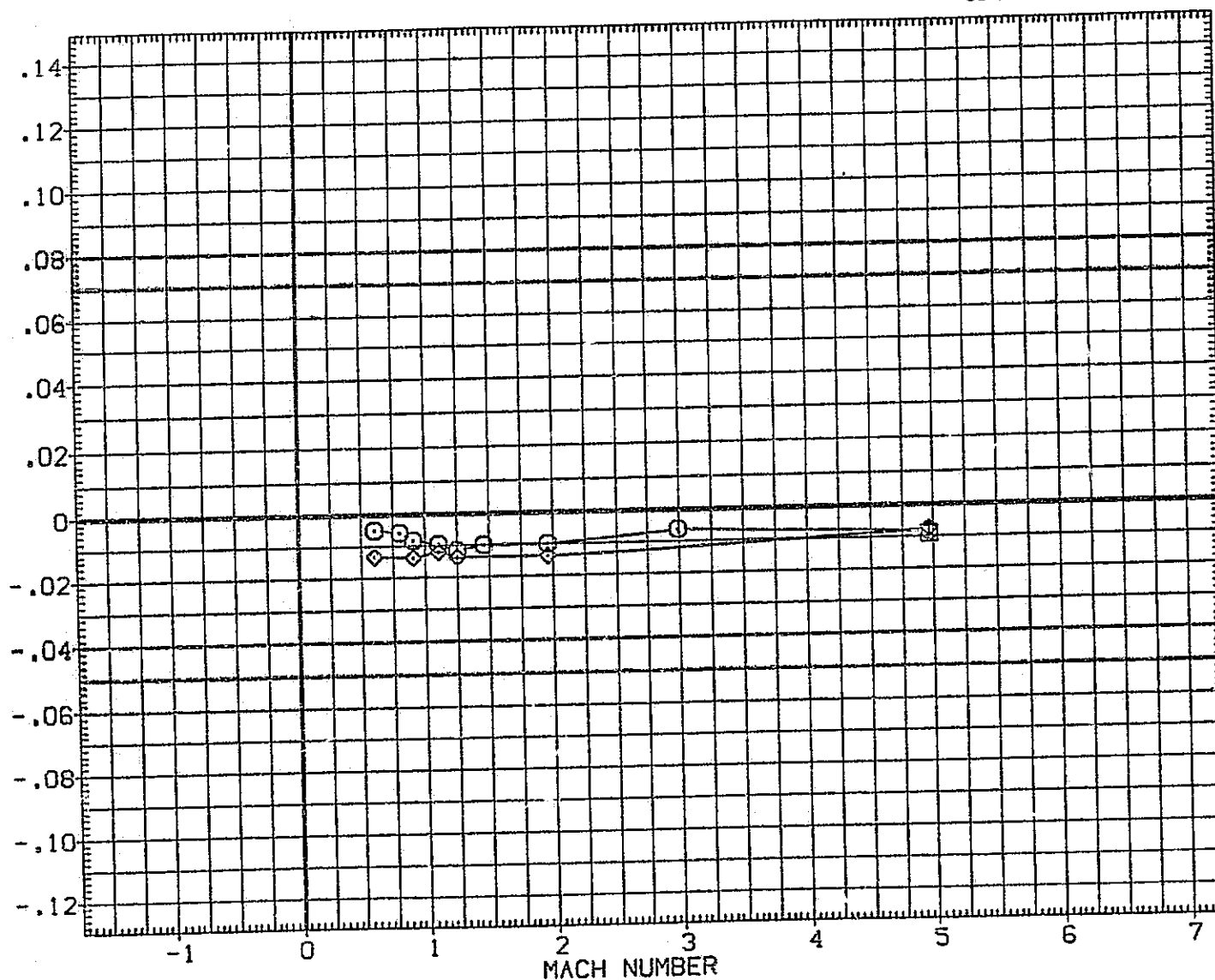


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(G)BETA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

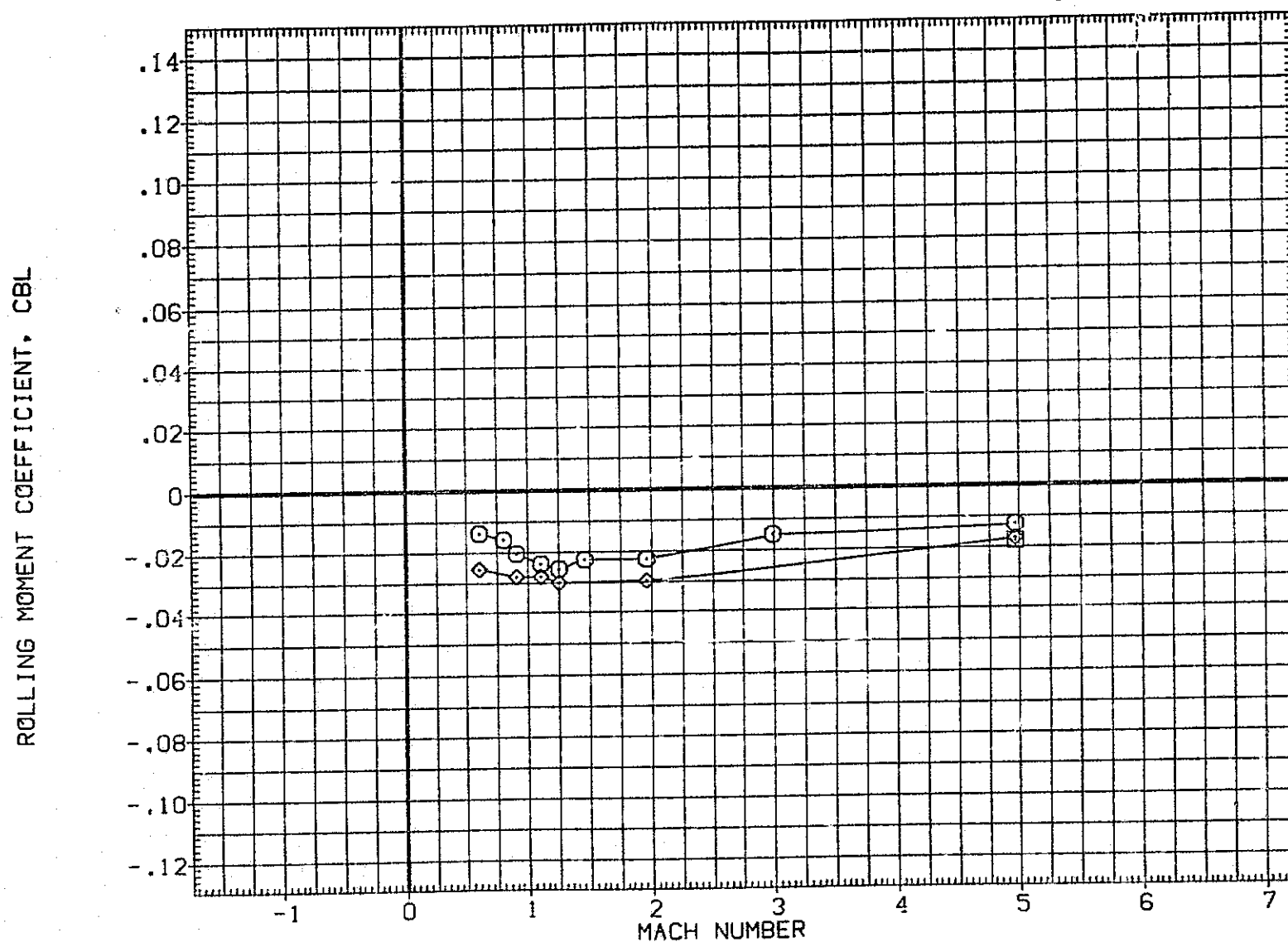


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(H)BETA = 4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

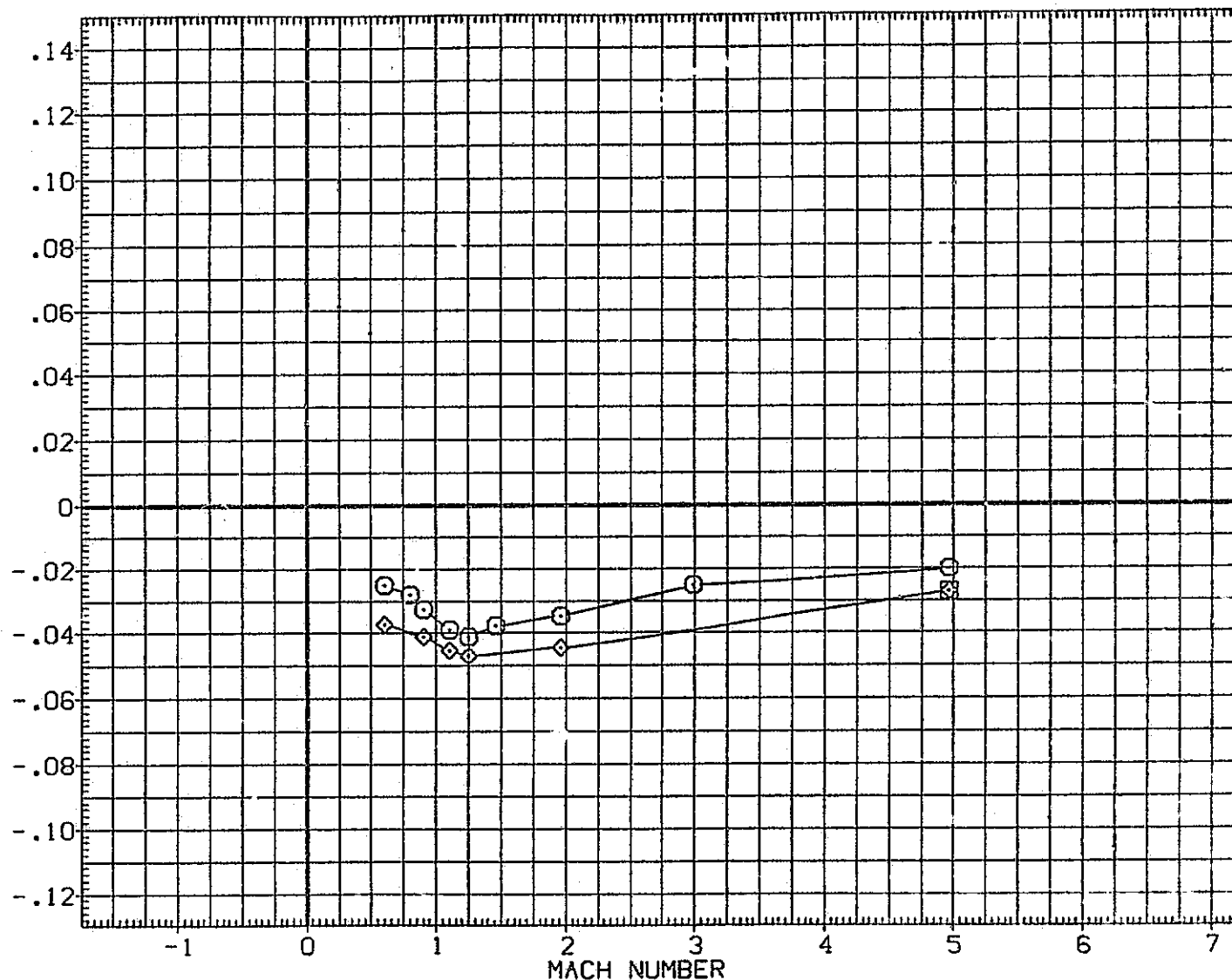


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (1)BETA = 6.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION

(VIC008)	○	MSFC S94(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC036)	□	MSFC S94(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022)	◇	MSFC S94(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION

SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

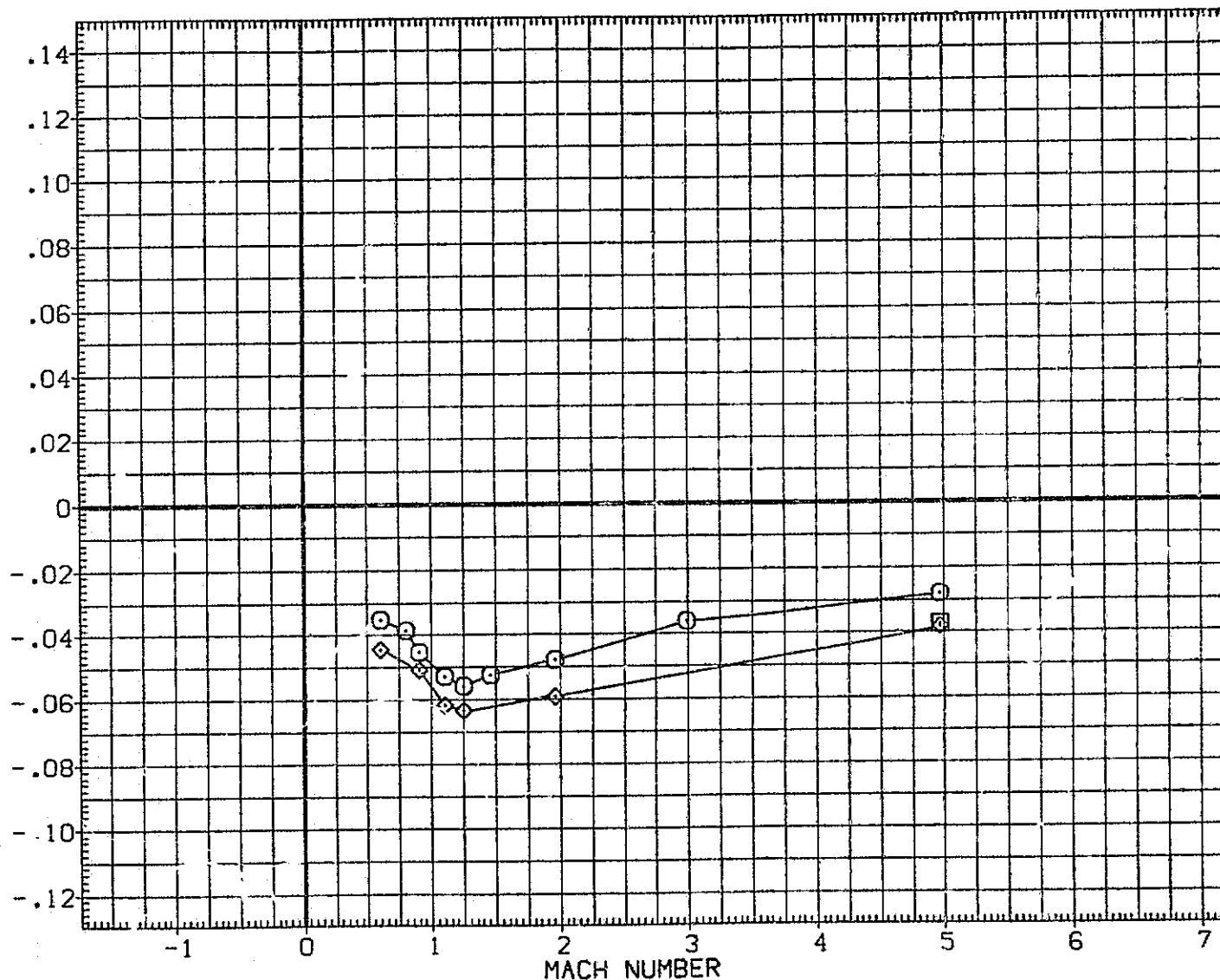


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(J)BETA = 8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	DRG STING
(VIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	DRG STING
(VIC036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	DRG STING
(VIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	DRG STING

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
YMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

ROLLING MOMENT COEFFICIENT, CBL

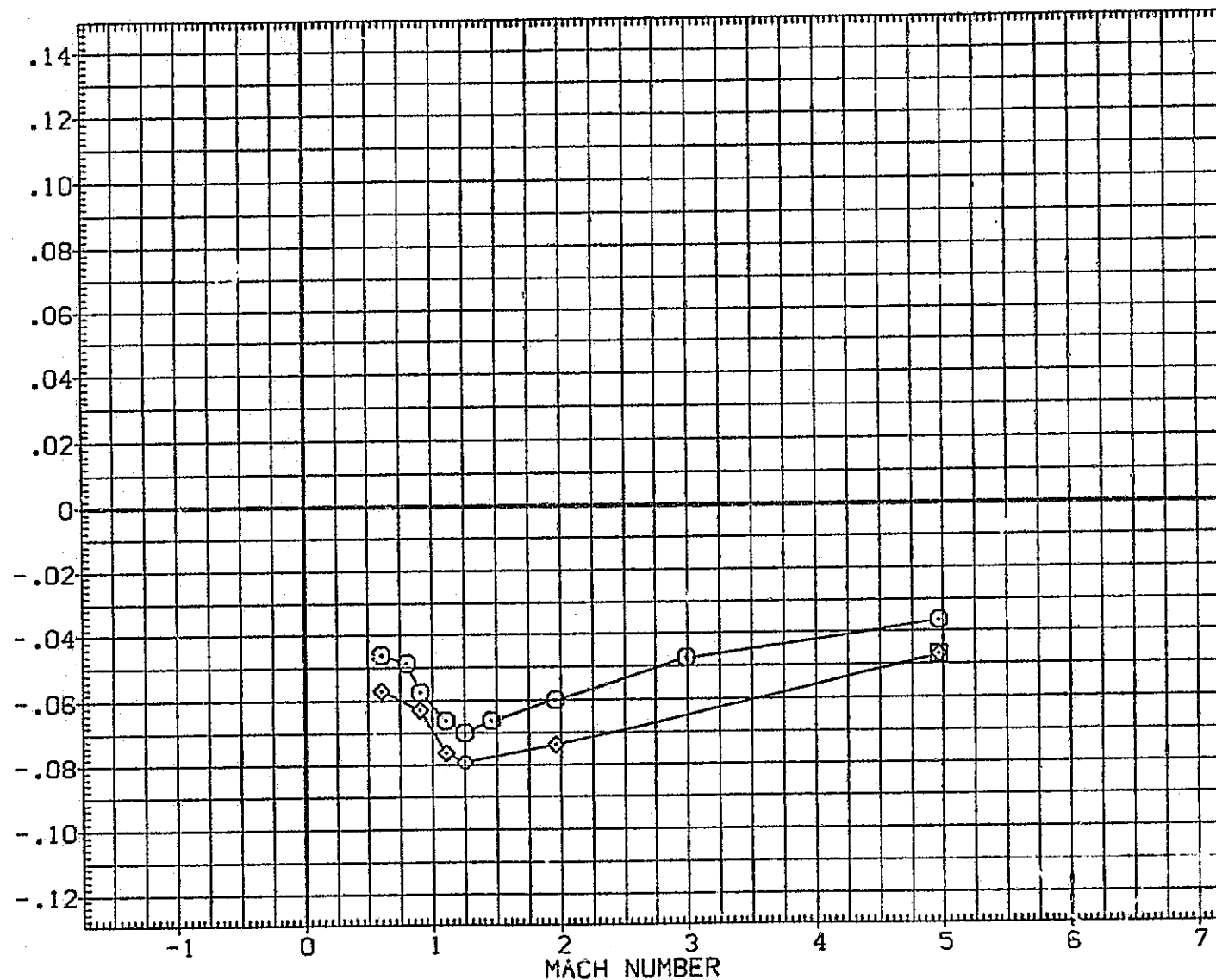


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (K)BETA = 10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(1A33) 740TS (TIP1S1P201)	ORB STING
(VIC036)	MSFC 594(1A33) 740TS (TIP1S3P201F2)	ORB STING
(VIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

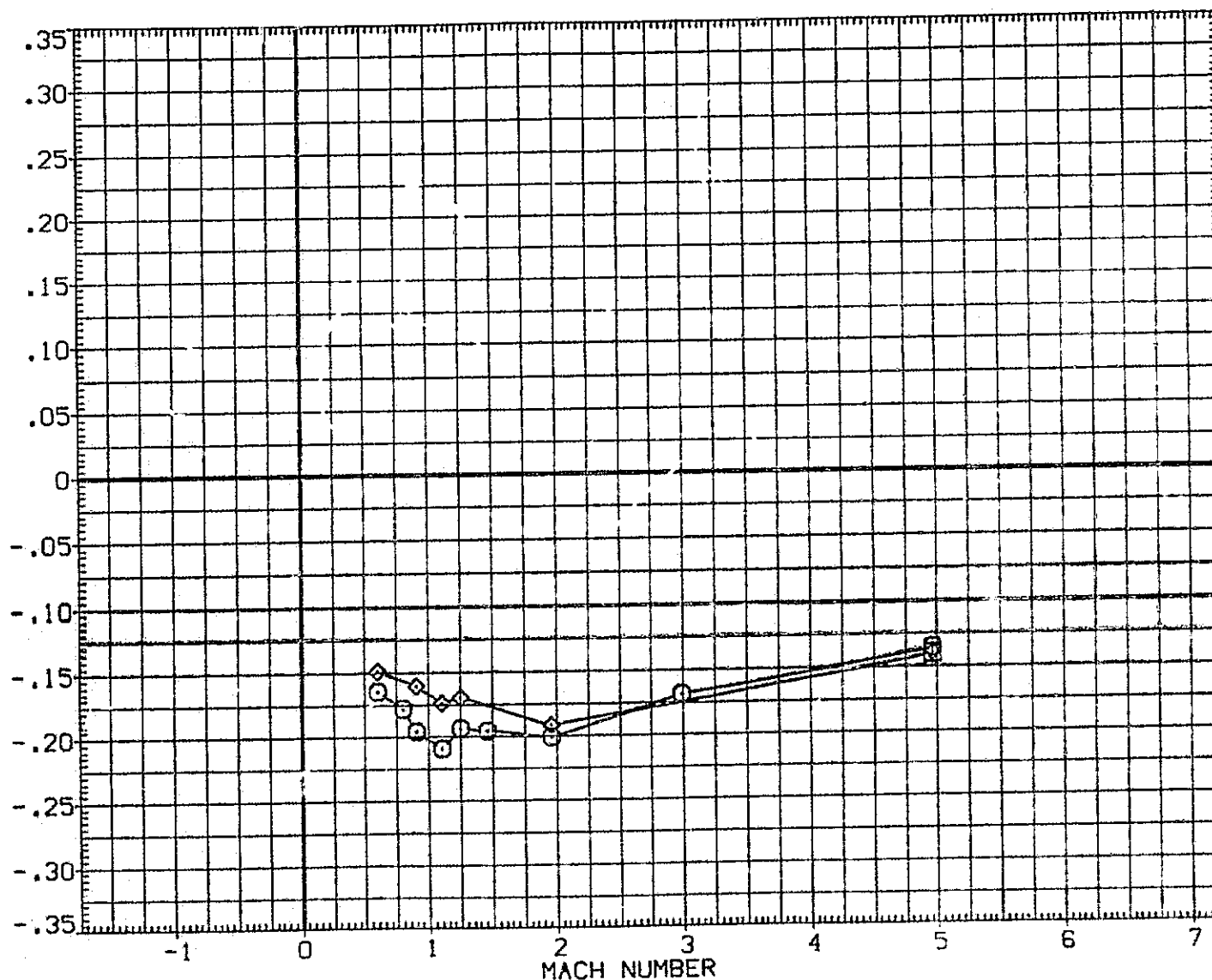


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (A) BETA = -10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
[VIC008]	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
[VIC036]	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
[VIC022]	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

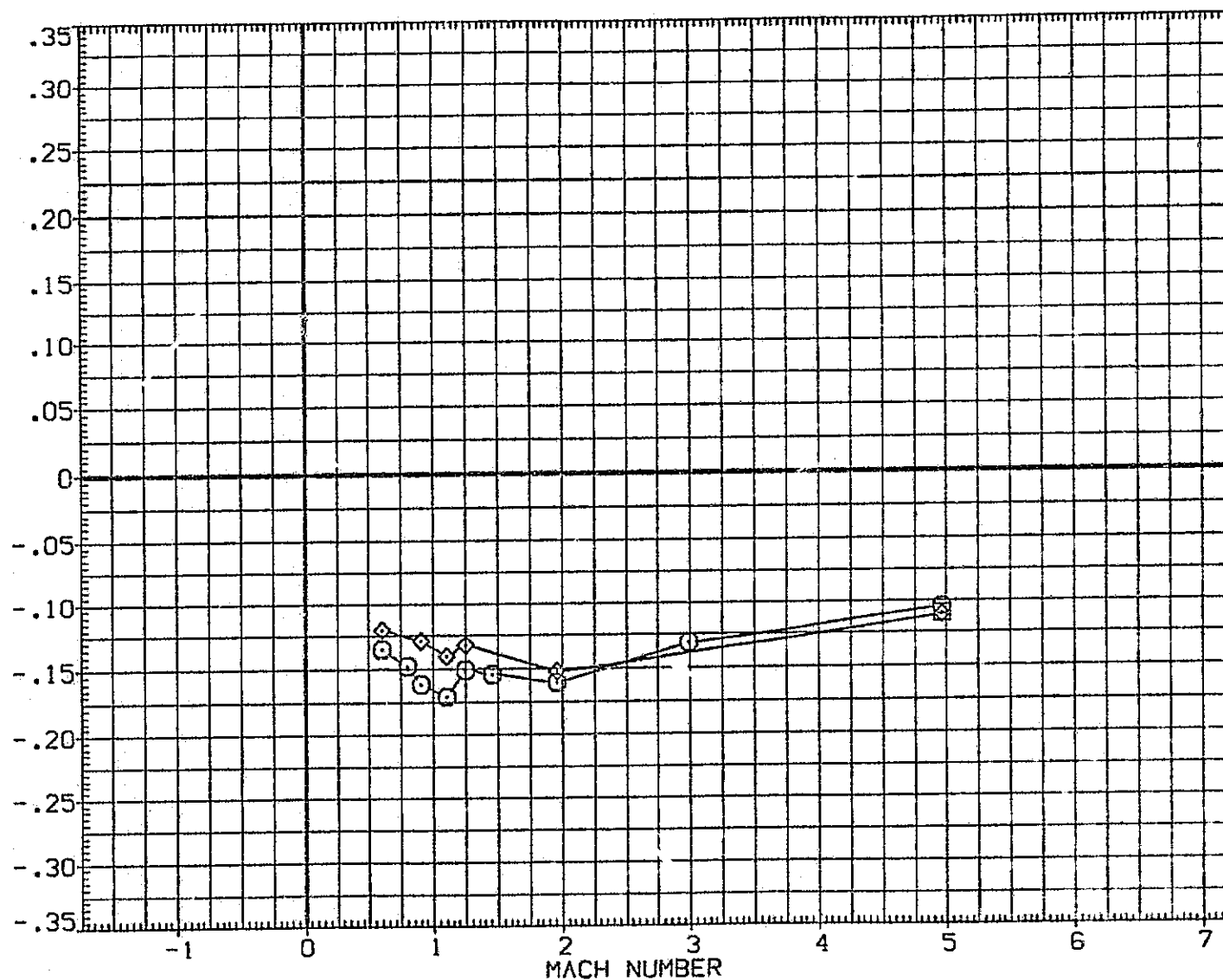


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(B) BETA = -8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(A33) 740TS (T1P1S1P201)	ORB STING
(VIC036)	MSFC 594(A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022)	MSFC 594(A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT.CYN

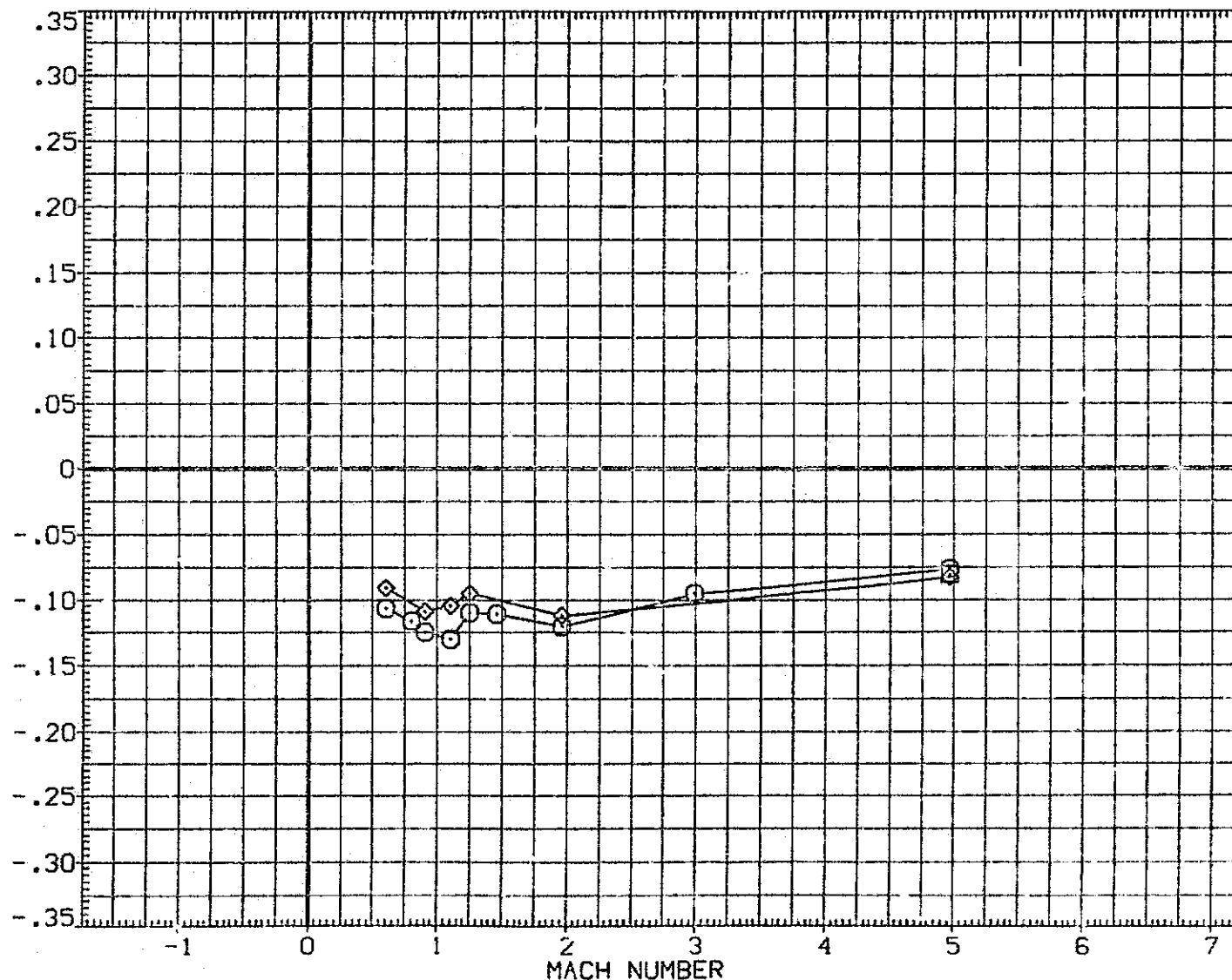


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(C)BETA = -6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

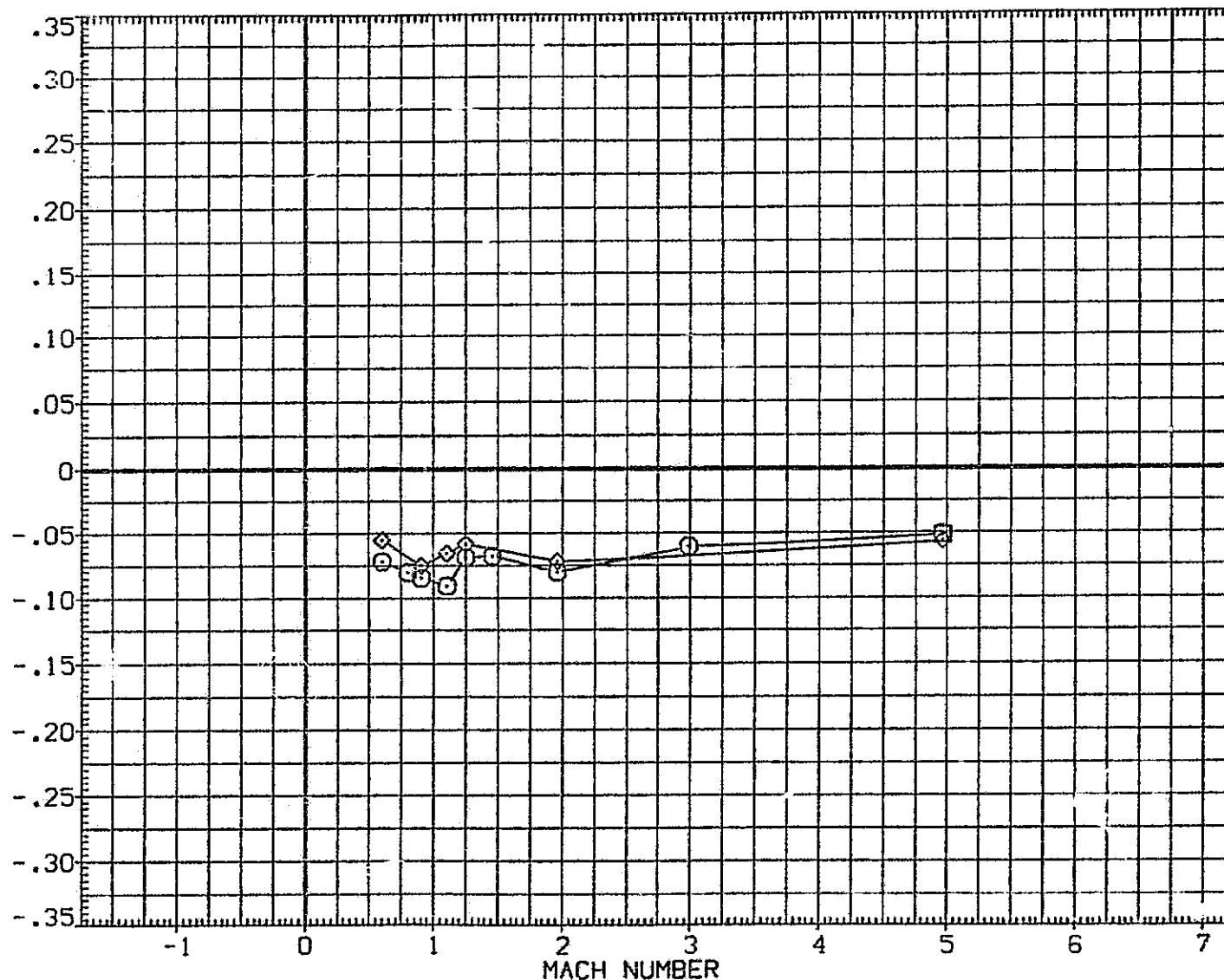


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAW STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (D)BETA = -4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

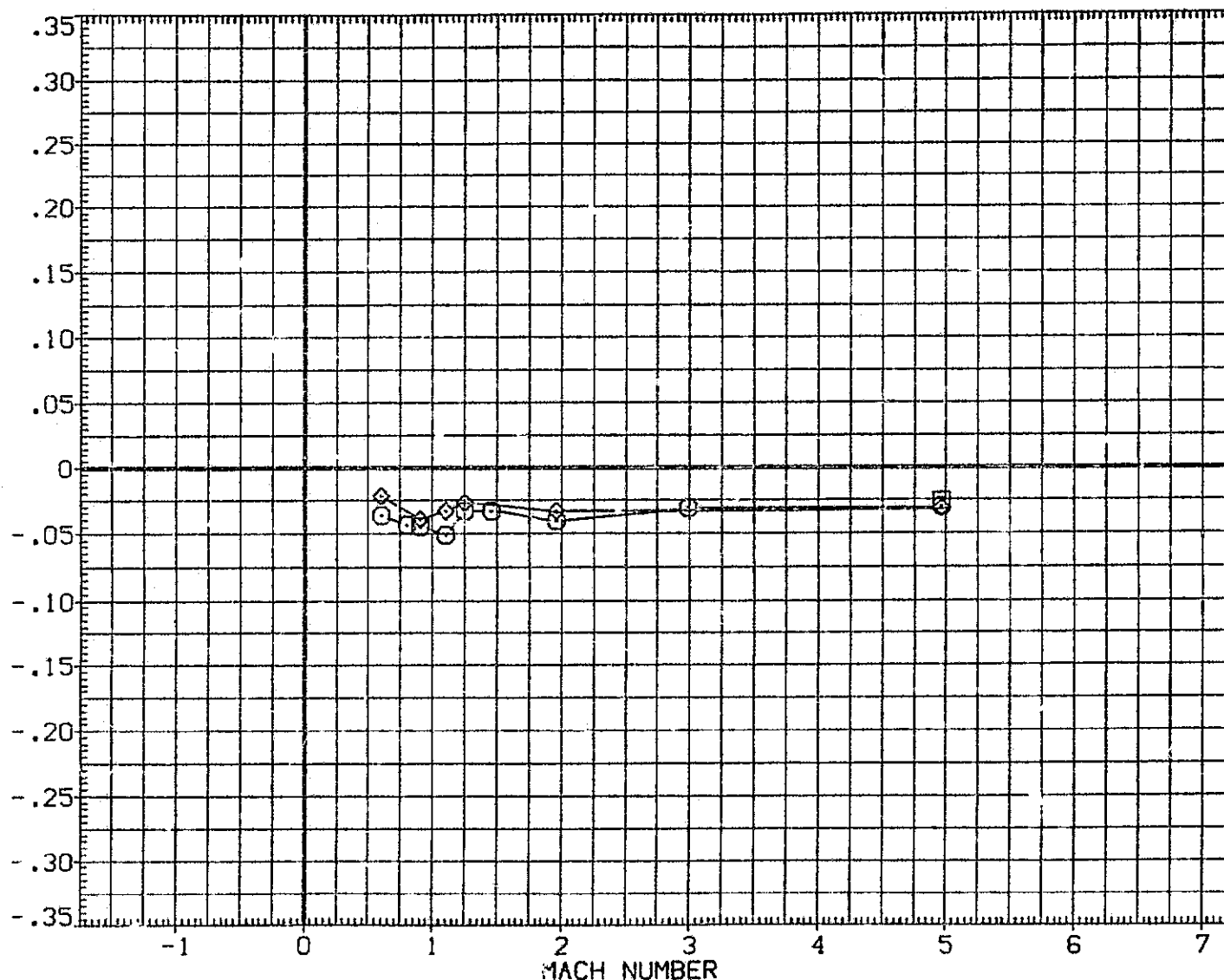


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(E)BETA = -2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	
(V1C008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(V1C036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(V1C022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

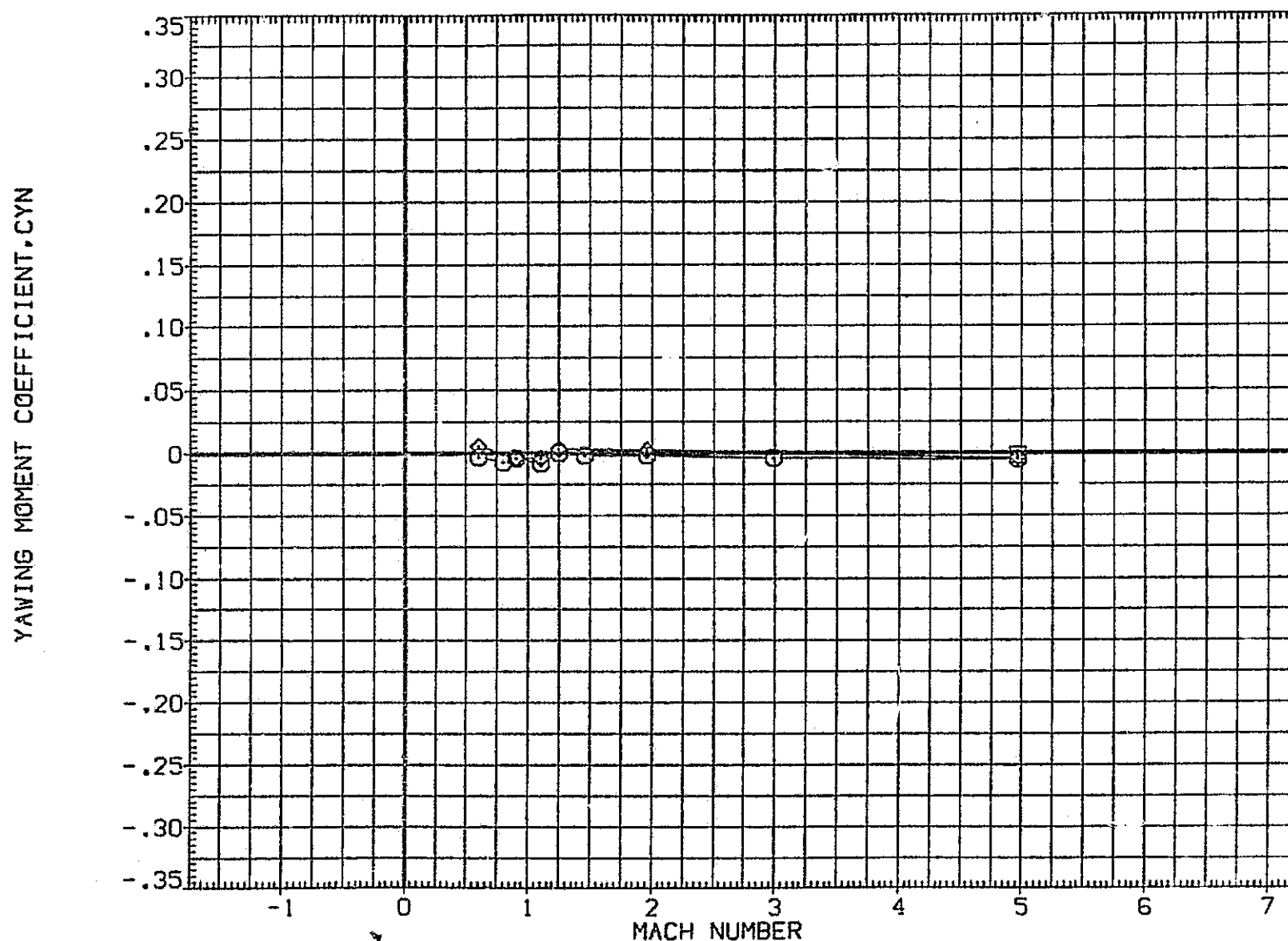


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (F)BETA = .00

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DATA SET SYMBOL CONFIGURATION DESCRIPTION ORB STING

(VIC008)	MSFC 594(1A33) 740TS (T1PIS1P201)	ORB STING
(VIC036)	MSFC 594(1A33) 740TS (T1PIS3P201F2)	ORB STING
(VIC022)	MSFC 594(1A33) 740TS (T2PIS3P201F2)	ORB STING

REFERENCE INFORMATION

SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	975.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

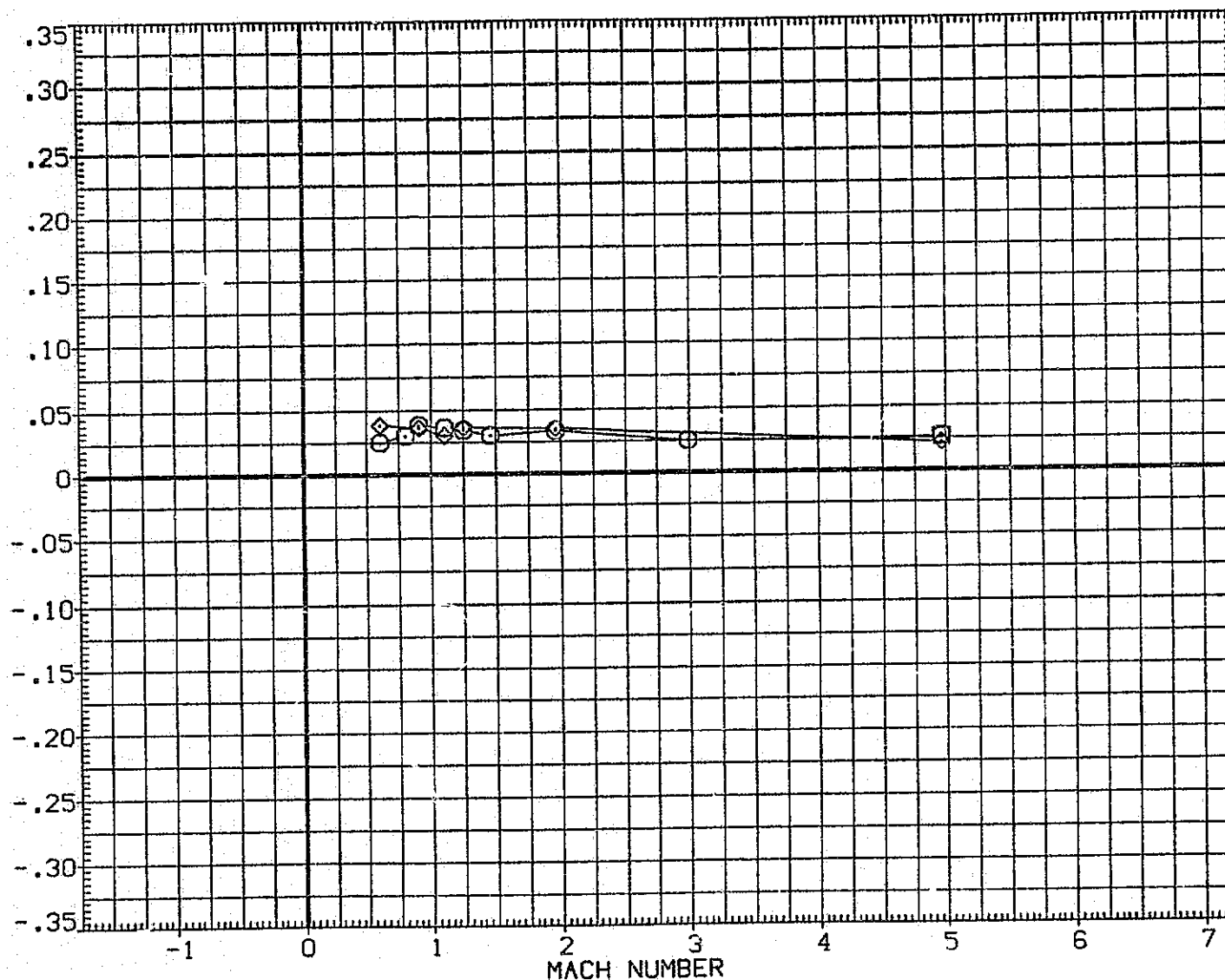


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(G)BETA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(V1C008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(V1C036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(V1C022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

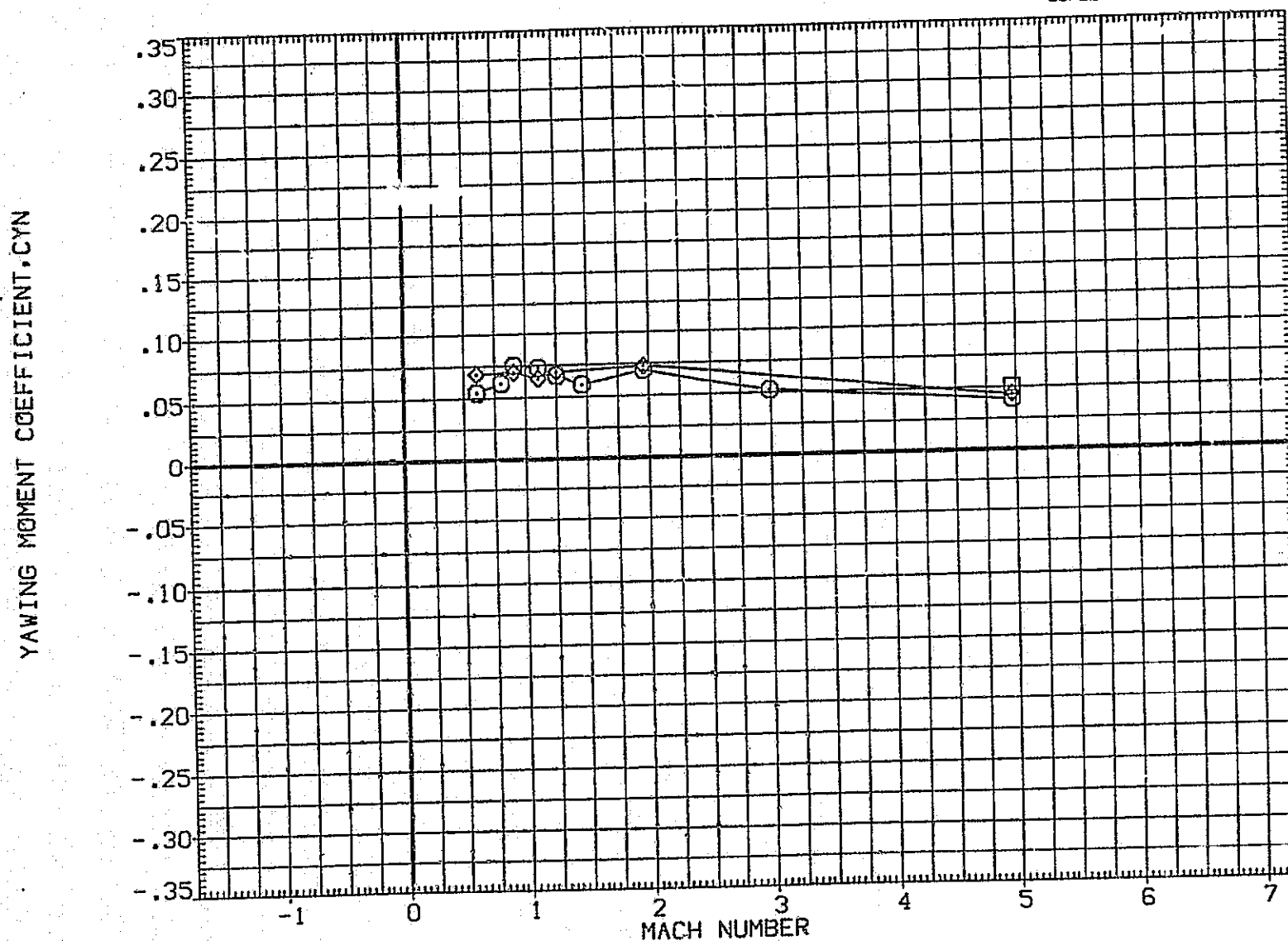


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (H)BETA = 4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008) ○	MSFC 594 (1A33) 740TS (T1P1S1P201)	ORB STING
(VIC036) □	MSFC 594 (1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022) ◇	MSFC 594 (1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

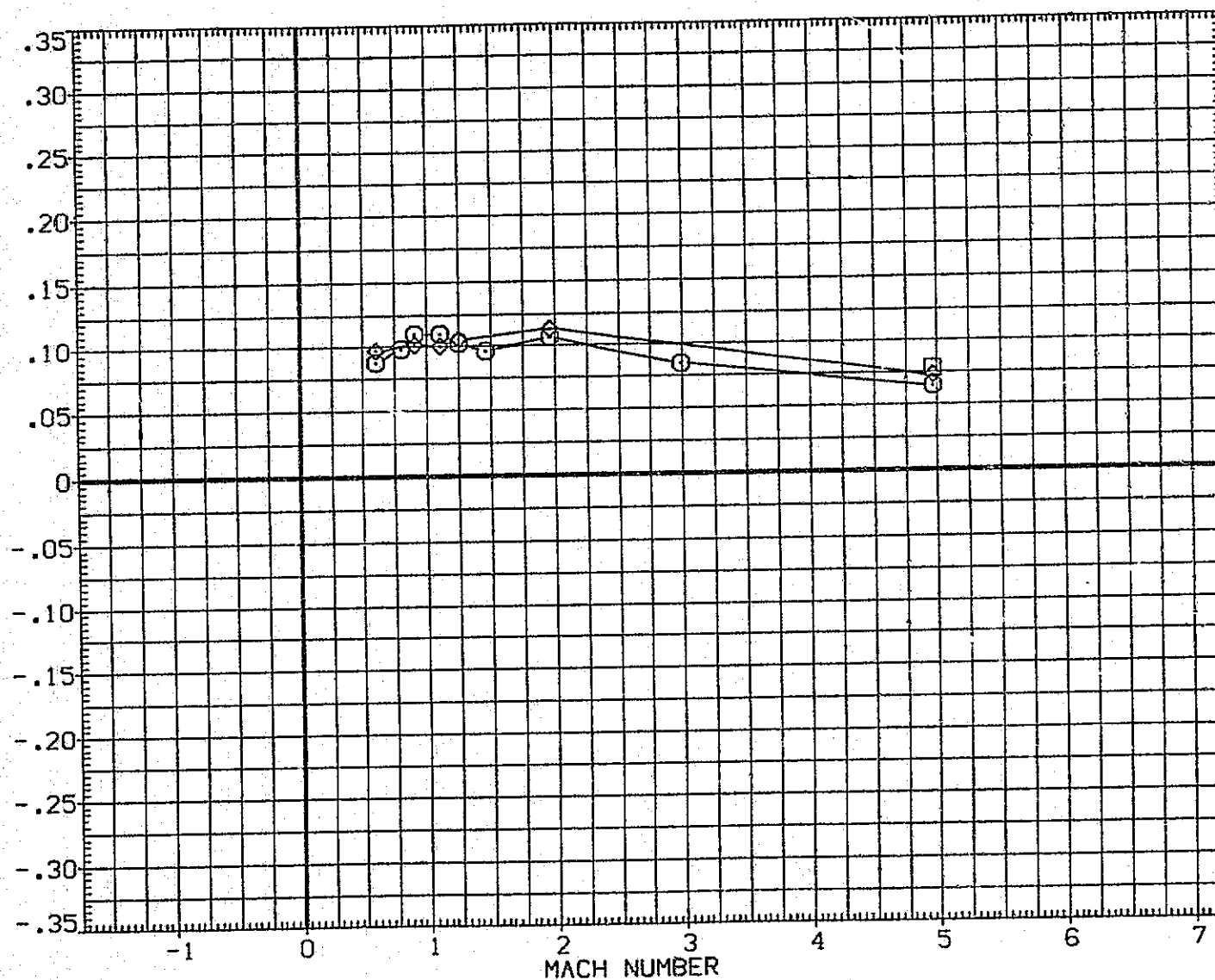


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
 (1) BETA = 6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
[VIC008]	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
[VIC036]	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
[VIC022]	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

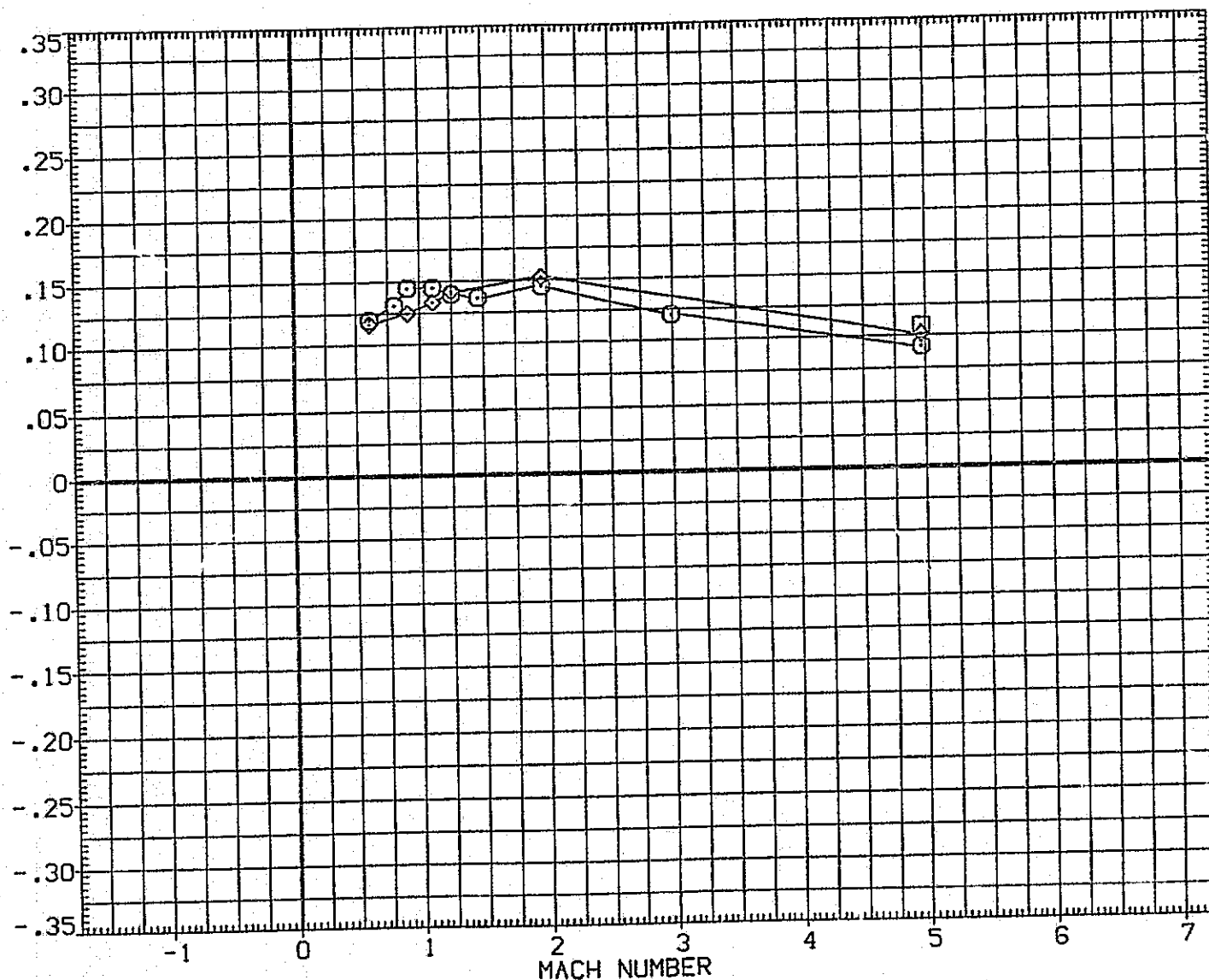


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(J)BETA = 8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(VIC008)	MSFC 594(1A33) 740TS (T1P1S1P201)	ORB STING
(VIC036)	MSFC 594(1A33) 740TS (T1P1S3P201F2)	ORB STING
(VIC022)	MSFC 594(1A33) 740TS (T2P1S3P201F2)	ORB STING

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. YT
SCALE	.0040	

YAWING MOMENT COEFFICIENT, CYN

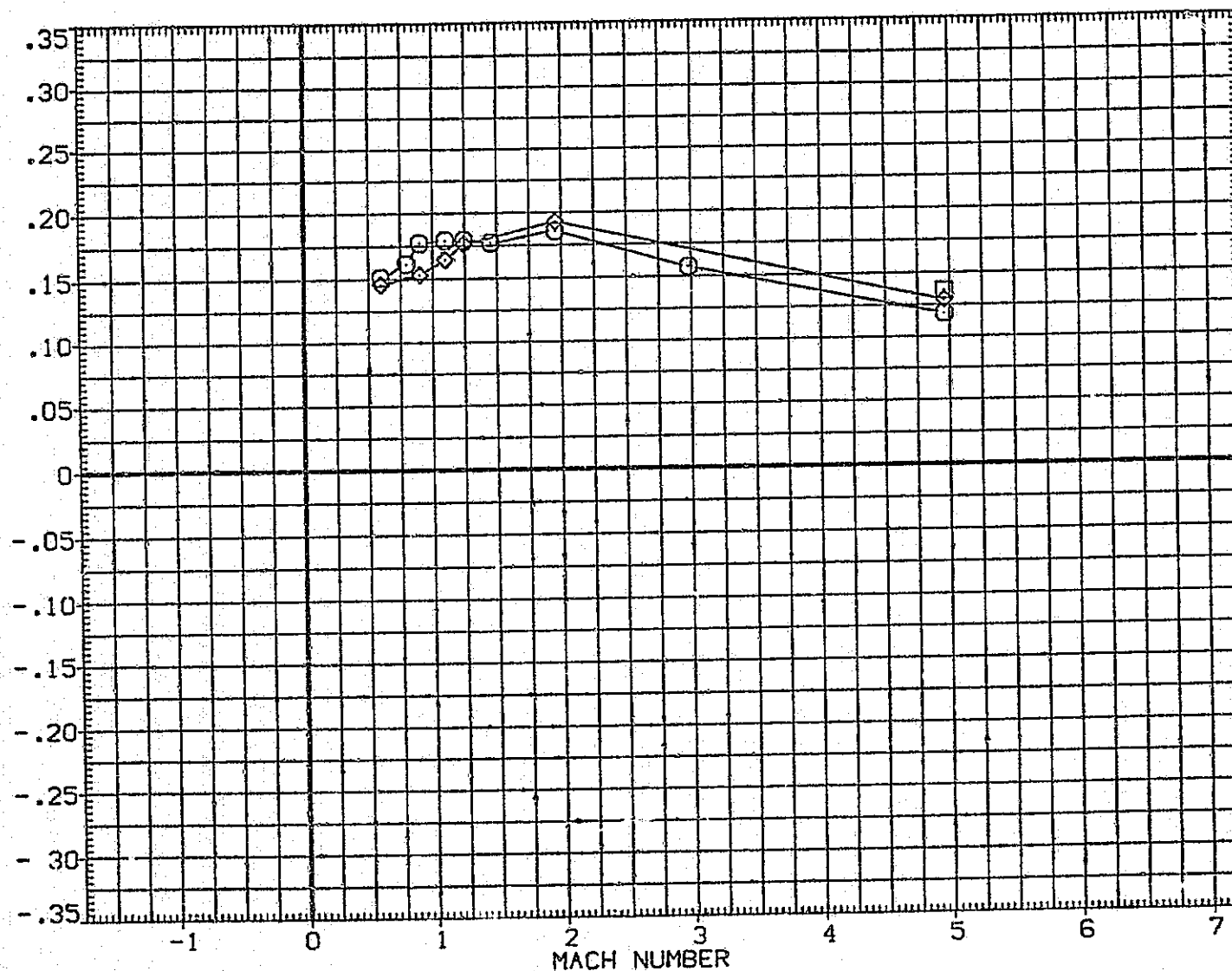


FIG11 LAUNCH VEHICLE-FIRST STAGE-DRAG STUDY EFFECT ON LATERAL/DIRECTIONAL AERO
(K)BETA = 10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C007)	MSFC 594(1A33) 740TS (T1P1S1P201)
(A1C011)	MSFC 594(1A33) 740TS (T1P1S1P201)
(A1C014)	MSFC 594(1A33) 740TS (T1P1S1P201)

ORIG STING	RUDDER
ORIG STING	.000
ORIG STING	-15.000
ORIG STING	-20.000

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

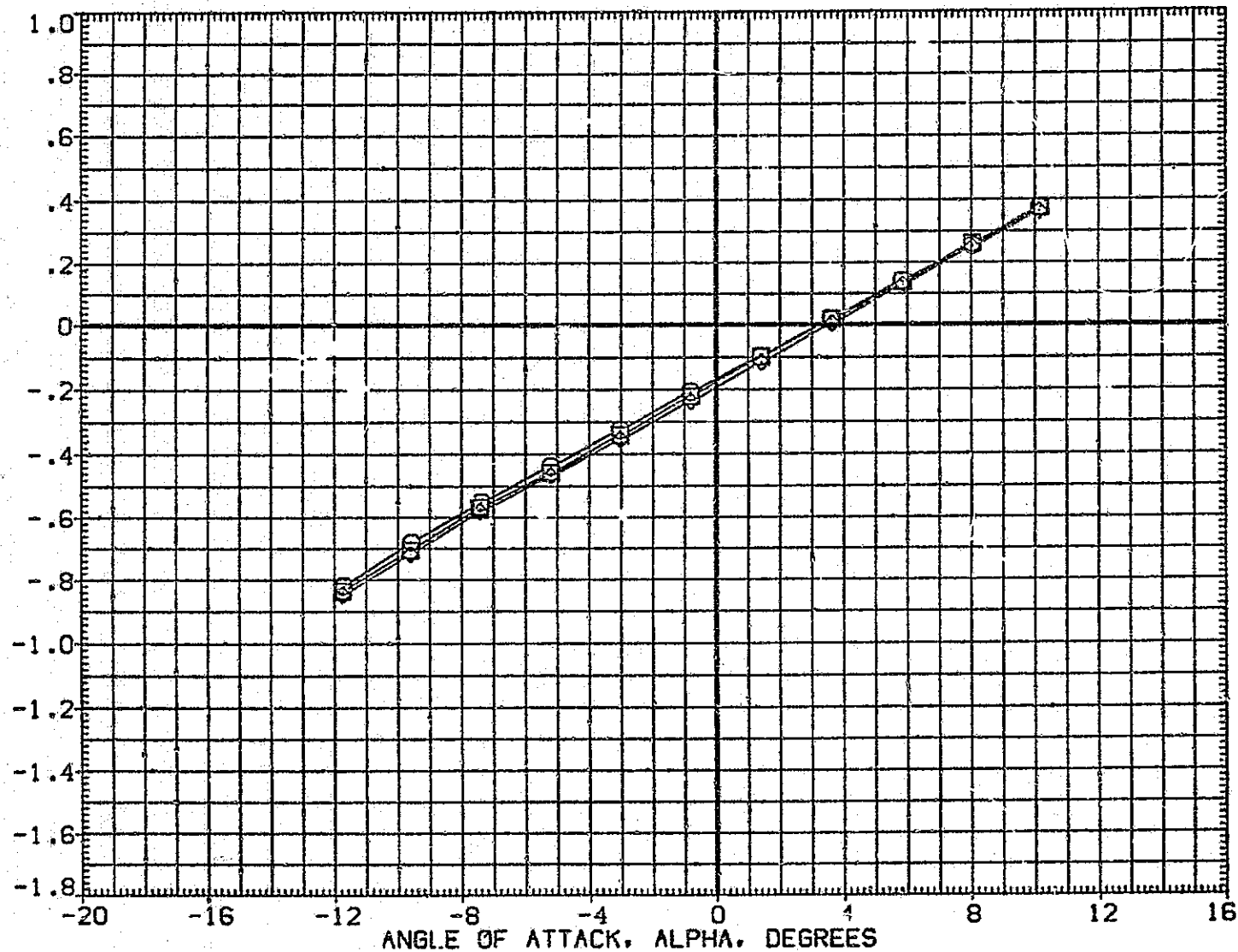


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(A) MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C007)	MSFC 594(1A33) 740TS (71P1S1P201)
(A1C011)	DATA NOT AVAILABLE
(A1C014)	DATA NOT AVAILABLE

ORB STING	RUDDER
	.000
	-15.000
	-20.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

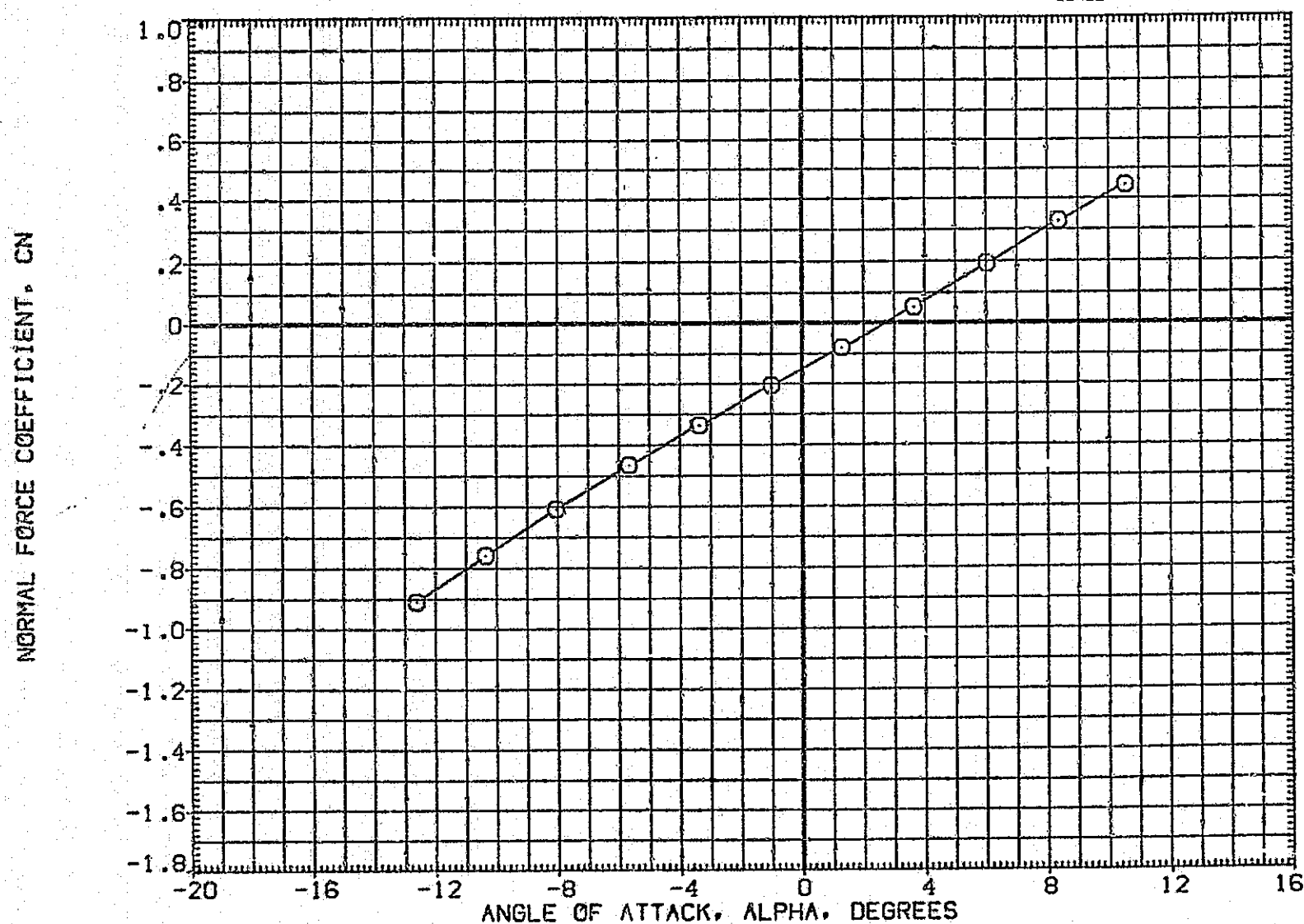


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	RUDDER	REFERENCE INFORMATION
[A1C007]	MSFC 594(1A33) 740TS (TIP1S1P201)	ORB STING	.000	SREF 2690.0000 SQ. FT
[A1C011]	MSFC 594(1A33) 740TS (TIP1S1P201)	ORB STING	-15.000	LREF 1290.0000 IN.
[A1C014]	MSFC 594(1A33) 740TS (TIP1S1P201)	ORB STING	-20.000	BREF 1290.0000 IN.
				XMRP 976.0000 IN. XT
				YMRP .0000 IN. YT
				ZMRP 400.0000 IN. ZT
				SCALE .0040

NORMAL FORCE COEFFICIENT, CN

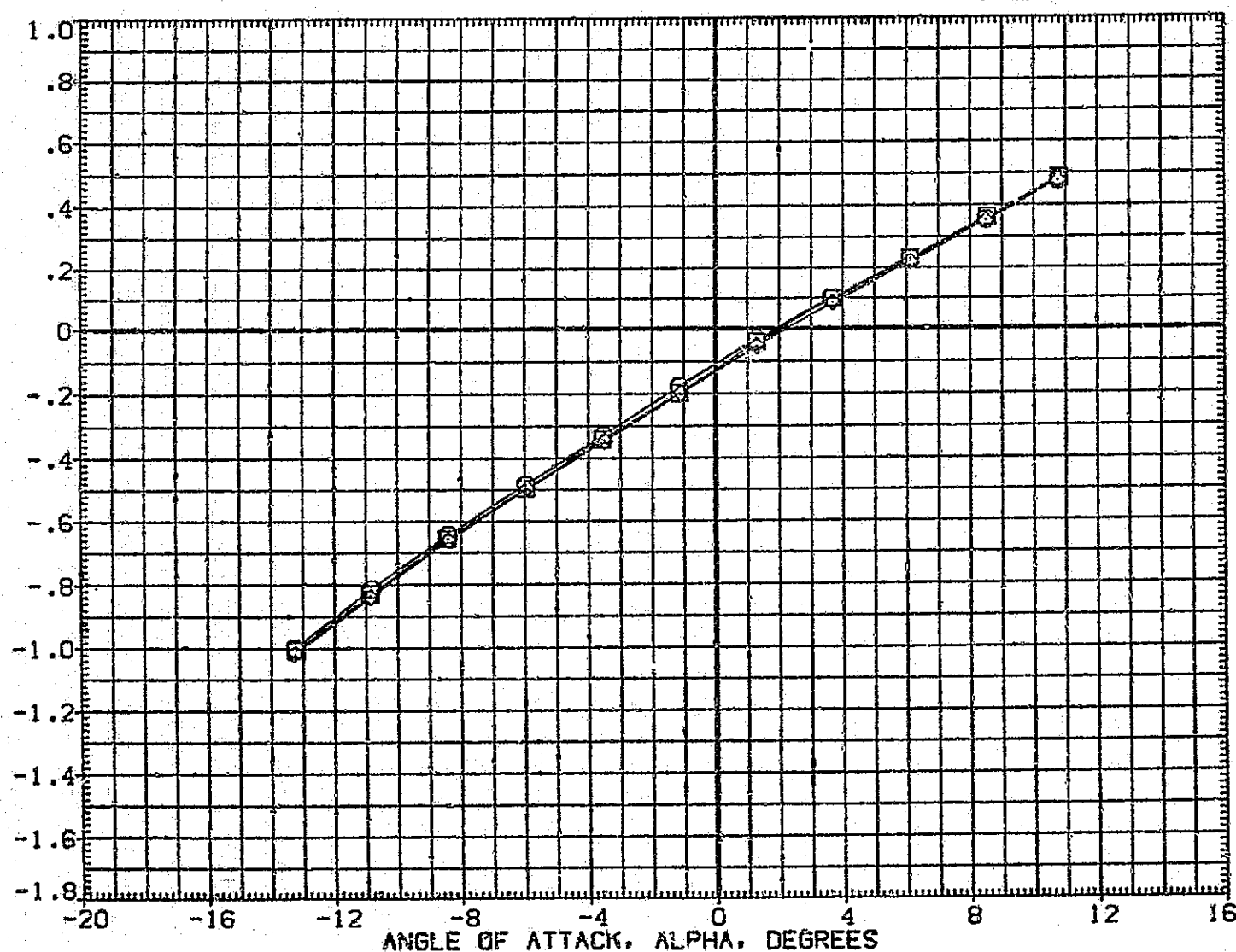


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(C)MACH = .91

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (A1C007) ○ MSFC 594(1A33) 740TS (TIP1S1P2Q1)
 (A1C011) ○ DATA NOT AVAILABLE
 (A1C014) ○ DATA NOT AVAILABLE

ORB STING RUDDER
 -15.000
 -20.000

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

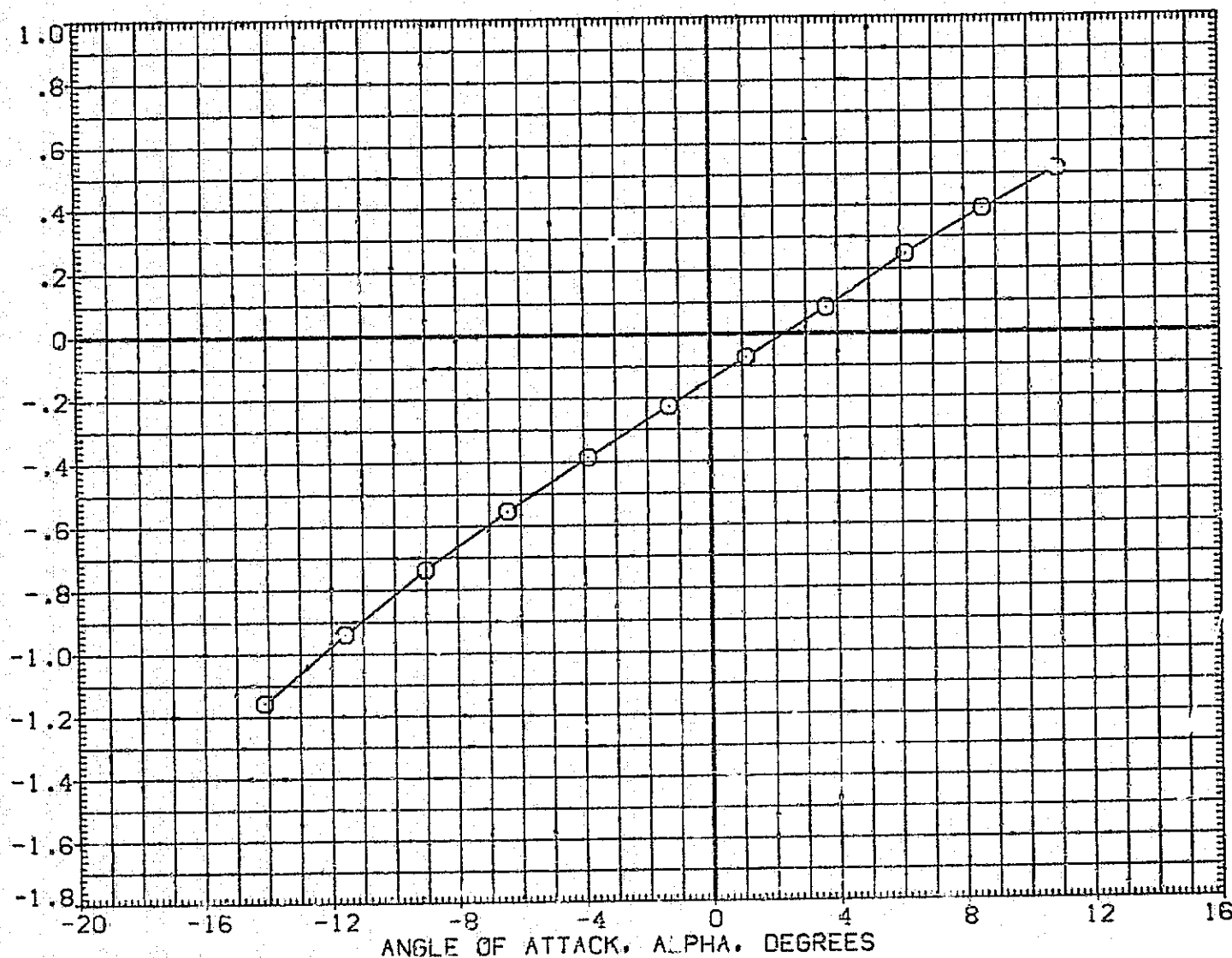


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C007)	MSFC 594(1A33) 740TS (T1P1S1P201)
(A1C011)	MSFC 594(1A33) 740TS (T1P1S1P201)
(A1C014)	MSFC 594(1A33) 740TS (T1P1S1P201)

RUDDER
ORB STING .000
ORB STING -15.000
ORB STING -20.000

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

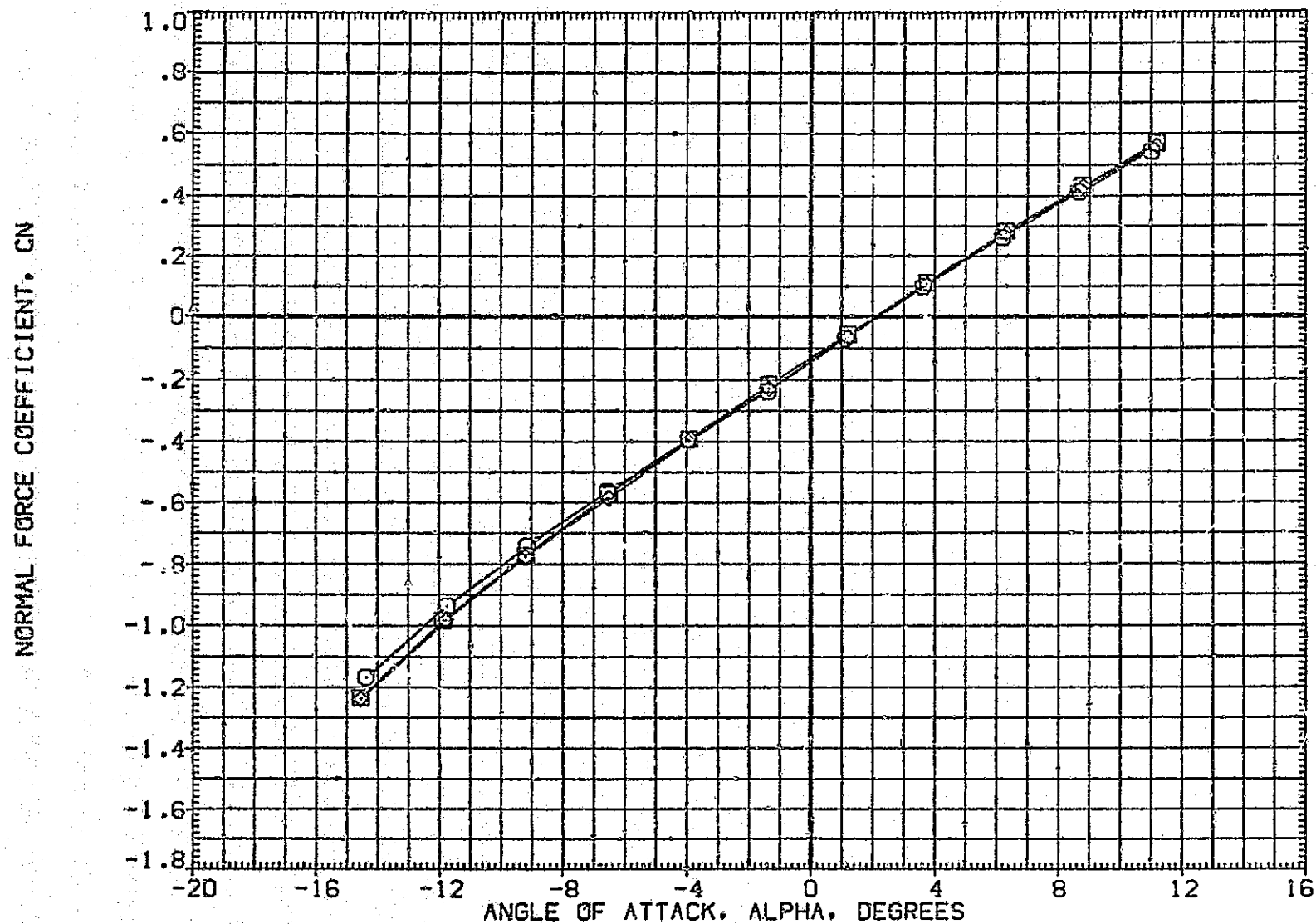


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)
(AIC011)	MSFC 594(1A33) 740TS (TIP1SIP201)
(AIC014)	MSFC 594(1A33) 740TS (TIP1SIP201)

RUDDER
ORB STING .000
ORB STING -15.000
ORB STING -20.000

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0090	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

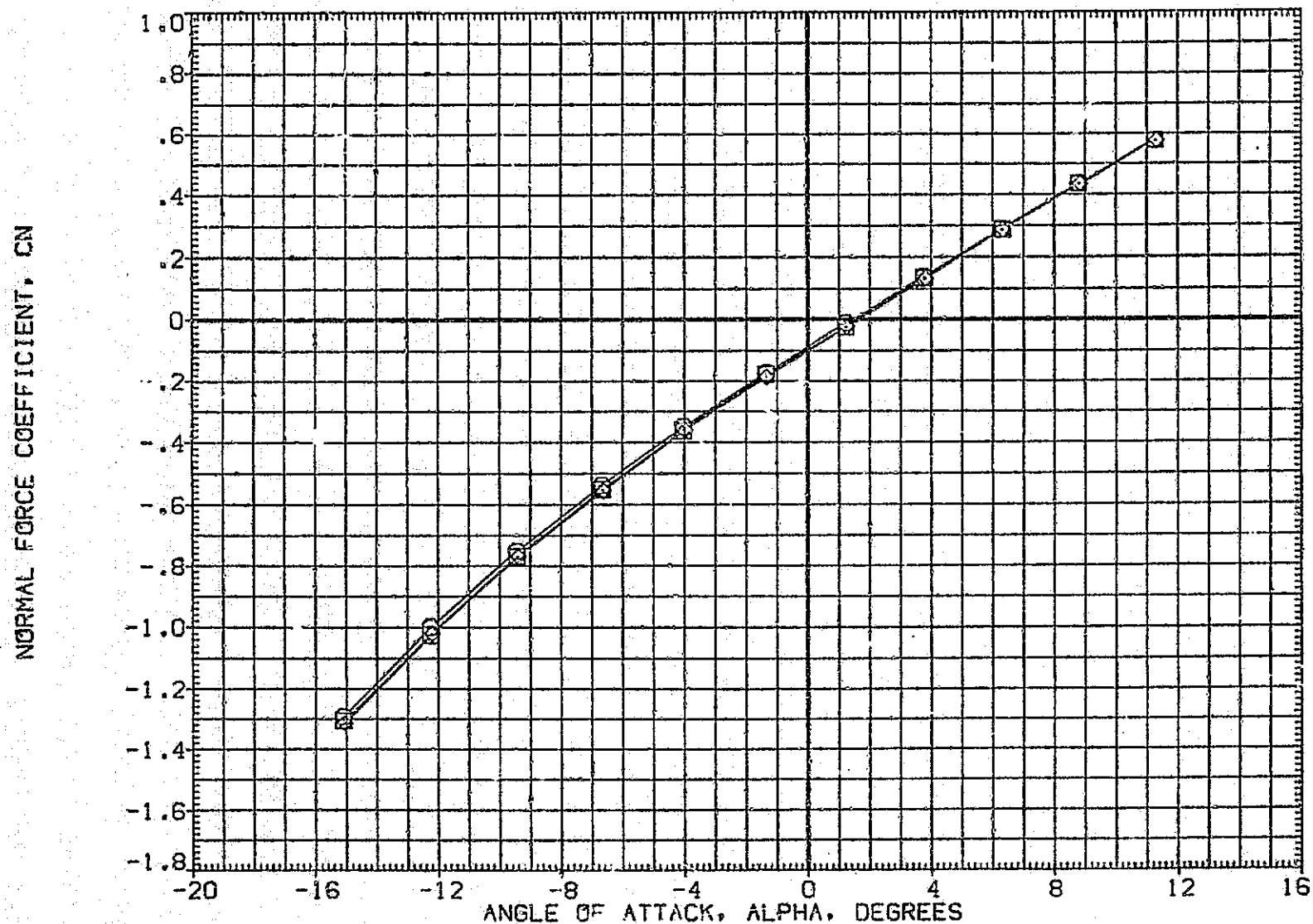


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(F)MACH = 1.25

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (A1C007) MSFC 594(1A33) 740TS (T1P1S1P201)
 (A1C011) DATA NOT AVAILABLE
 (A1C014) DATA NOT AVAILABLE

ORB STING

RUDDER
 .000
 -15.000
 -20.000

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

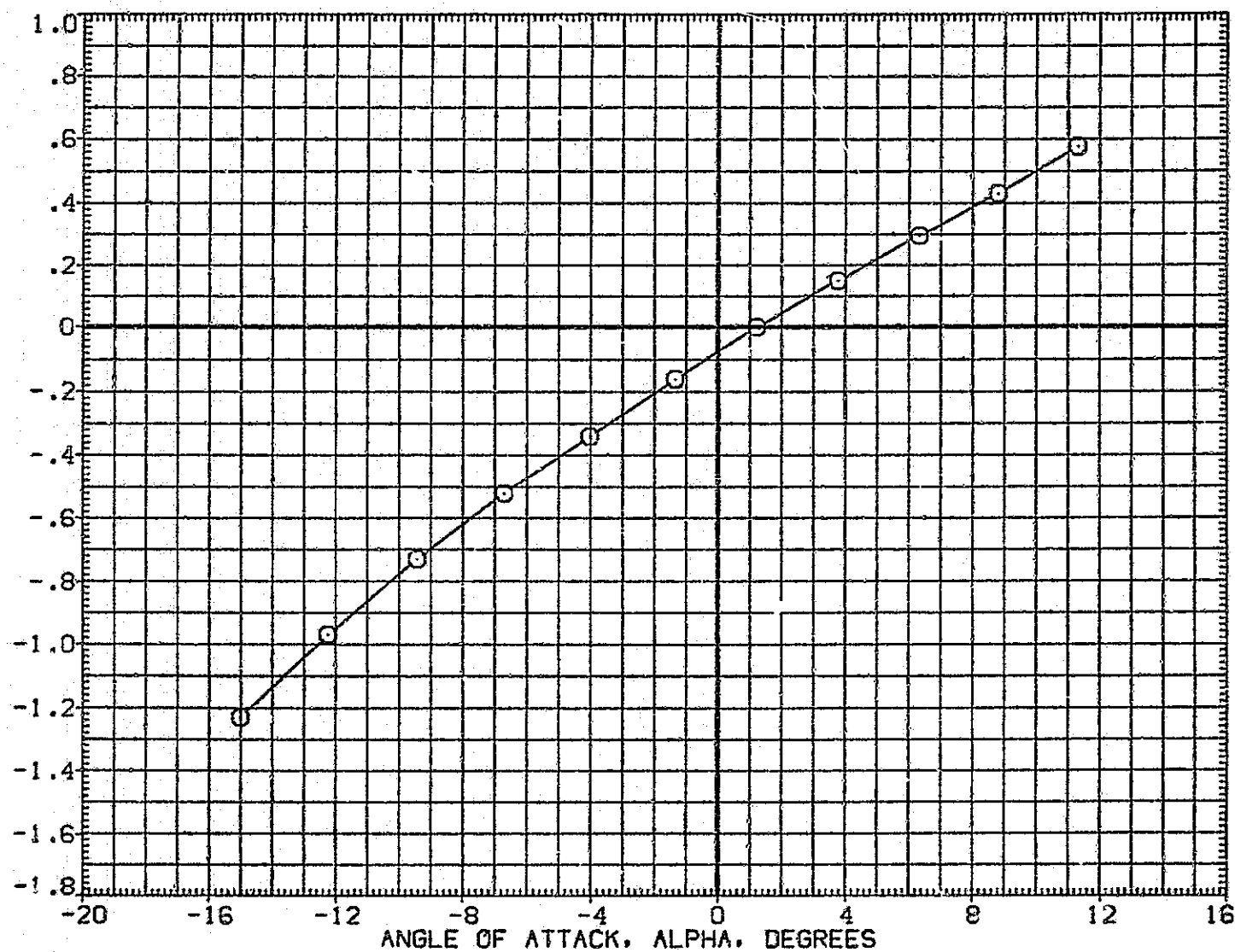


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(G)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C007)	MSFC 594(1A33) 740TS (T1P1S1P201)
(A1C011)	MSFC 594(1A33) 740TS (T1P1S1P201)
(A1C014)	MSFC 594(1A33) 740TS (T1P1S1P201)

ORB STING	RUDDER
ORB STING	.000
ORB STING	-15.000
ORB STING	-20.000

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XHRP	975.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

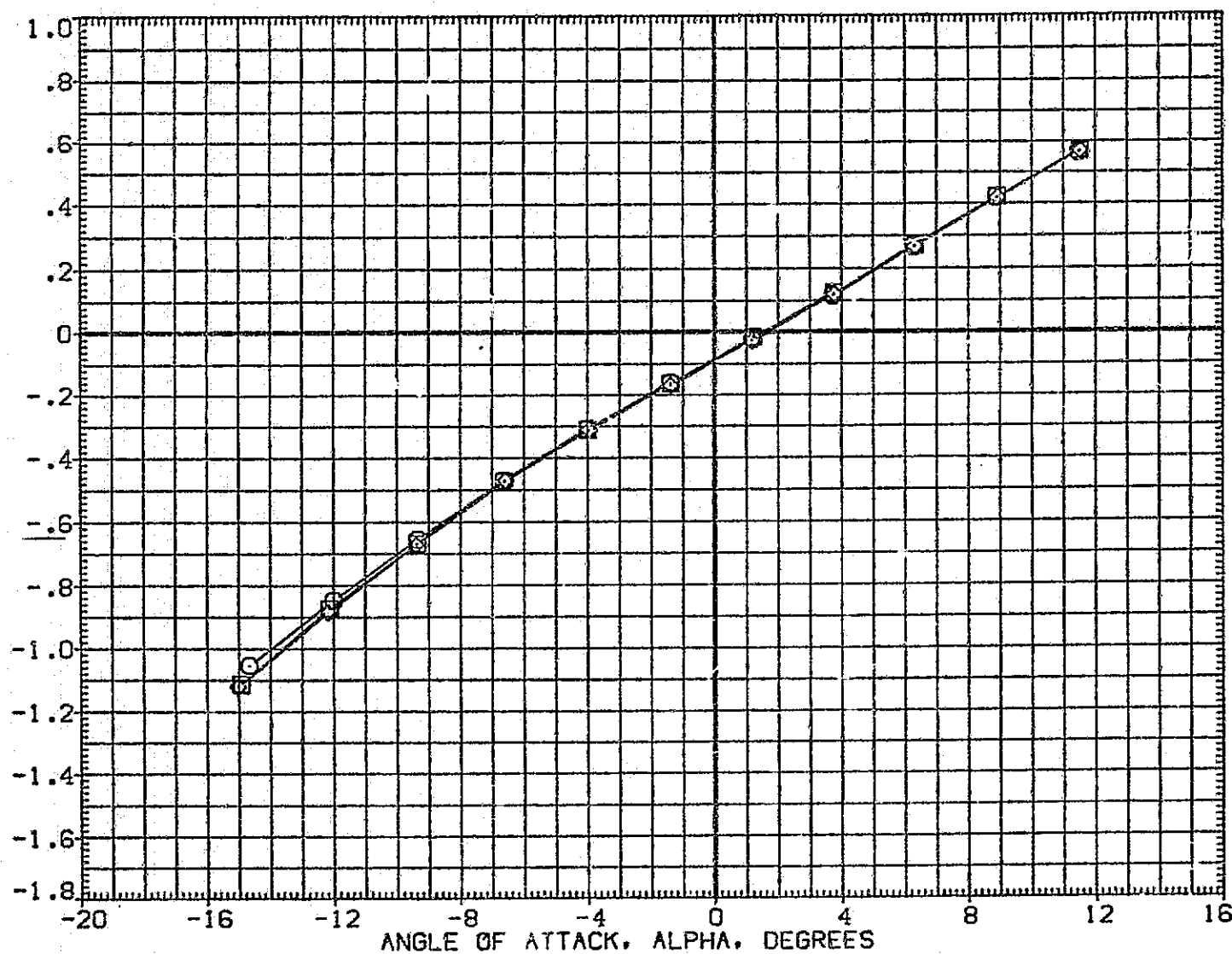


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

MACH = 1.97

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(A1C007)	MSFC S94(1A33) 740TS (TIP1SIP201)
(A1C011)	DATA NOT AVAILABLE
(A1C014)	DATA NOT AVAILABLE

ORB STING

RUDDER
 .000
 -15.000
 -20.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT, CN

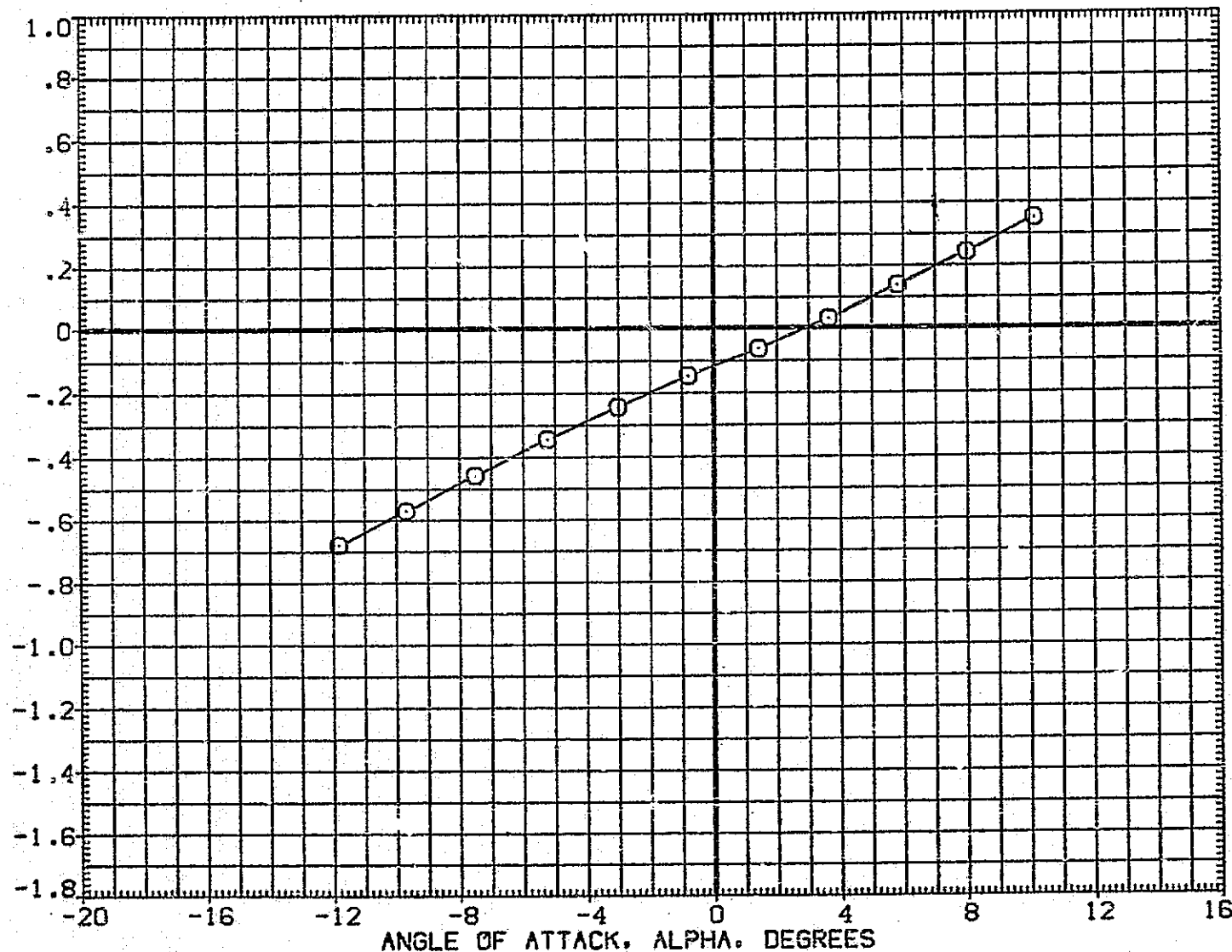


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(1)MACH = 2.99

DATA SET SYMBOL CONFIGURATION DESCRIPTION

{A1C007} MSFC 594(1A33) 740TS (TIP1S1P201)
 {A1C011} MSFC 594(1A33) 740TS (TIP1S1P201)
 {A1C014} MSFC 594(1A33) 740TS (TIP1S1P201)

ORB STING RUDDER
 ORB STING .000
 ORB STING -15.000
 ORB STING -20.000

REFERENCE INFORMATION

SREF 2790.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT, CN

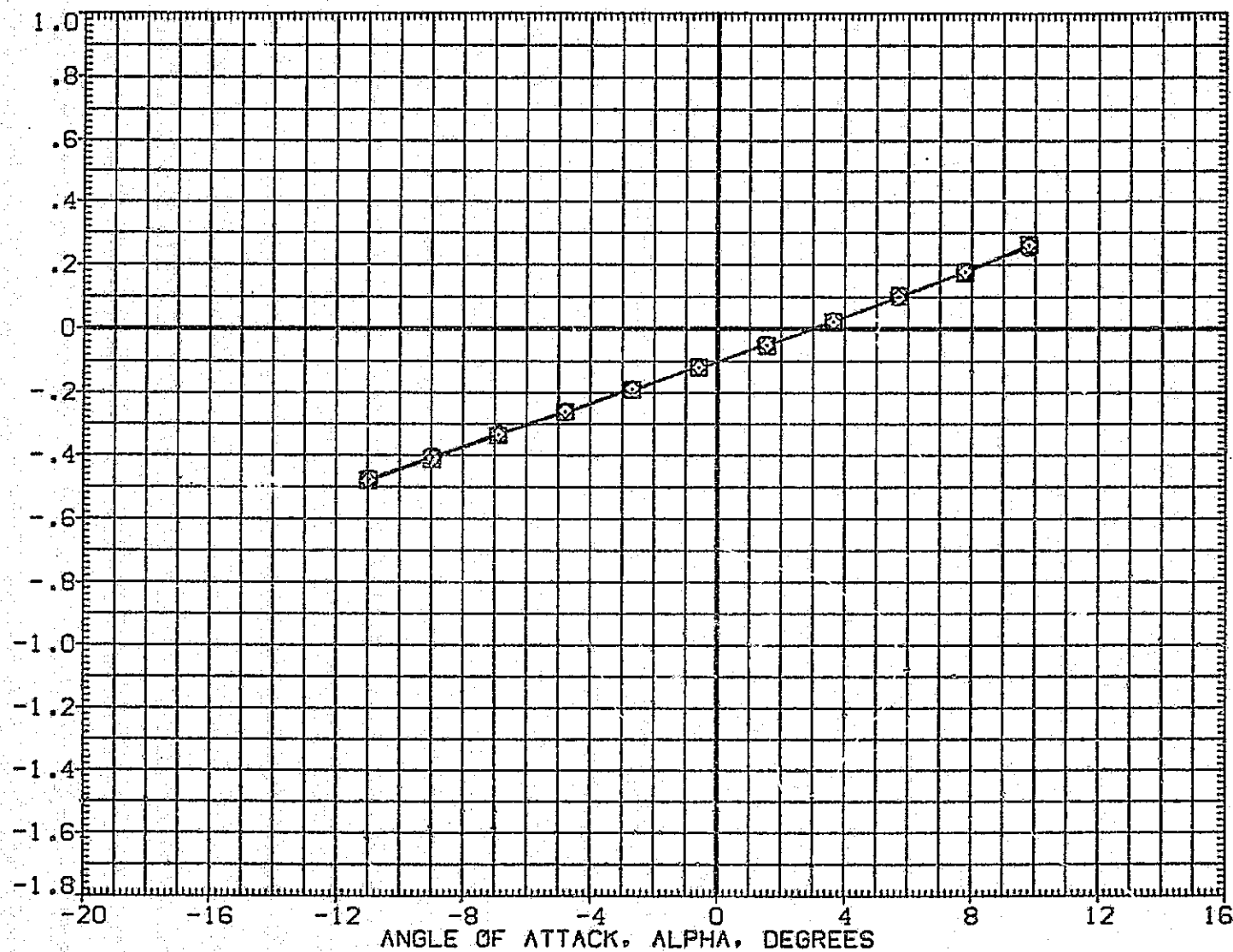


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

{J}MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
{A1C007}	MSFC 594(1A33) 740TS (T1P1S1P201)
{A1C011}	MSFC 594(1A33) 740TS (T1P1S1P201)
{A1C014}	MSFC 594(1A33) 740TS (T1P1S1P201)

ORB STING	RUDDER
ORB STING	.000
ORB STING	-15.000
ORB STING	-20.000

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

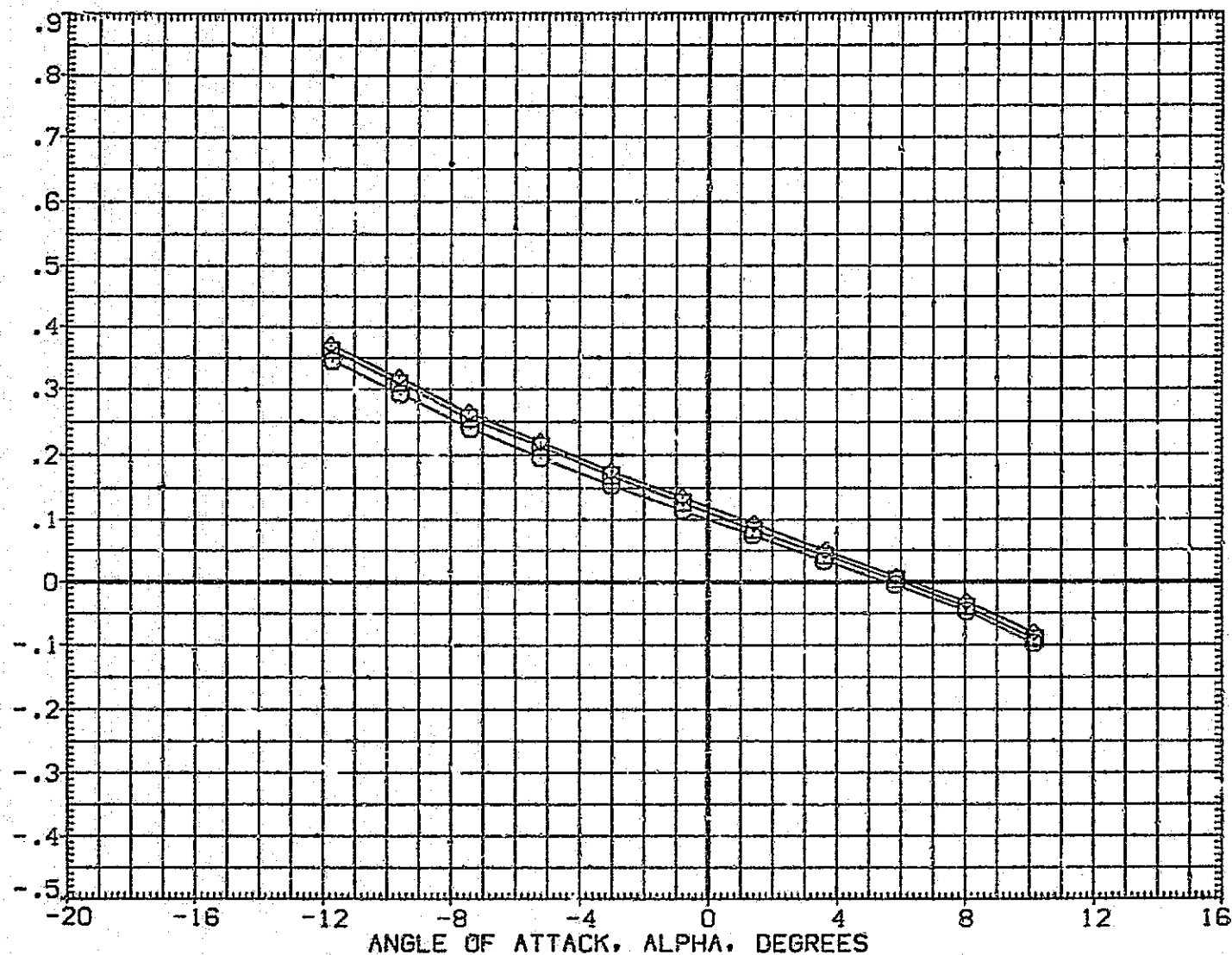


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(AJMACH = .60)

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING
(A1C007) ○	MSFC 594(1A33) 740TS (TIPISIP201)	
(A1C011) □	DATA NOT AVAILABLE	
(A1C014) ◇	DATA NOT AVAILABLE	

RUDDER
 .000
 -15.000
 -20.000

REFERENCE INFORMATION

SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

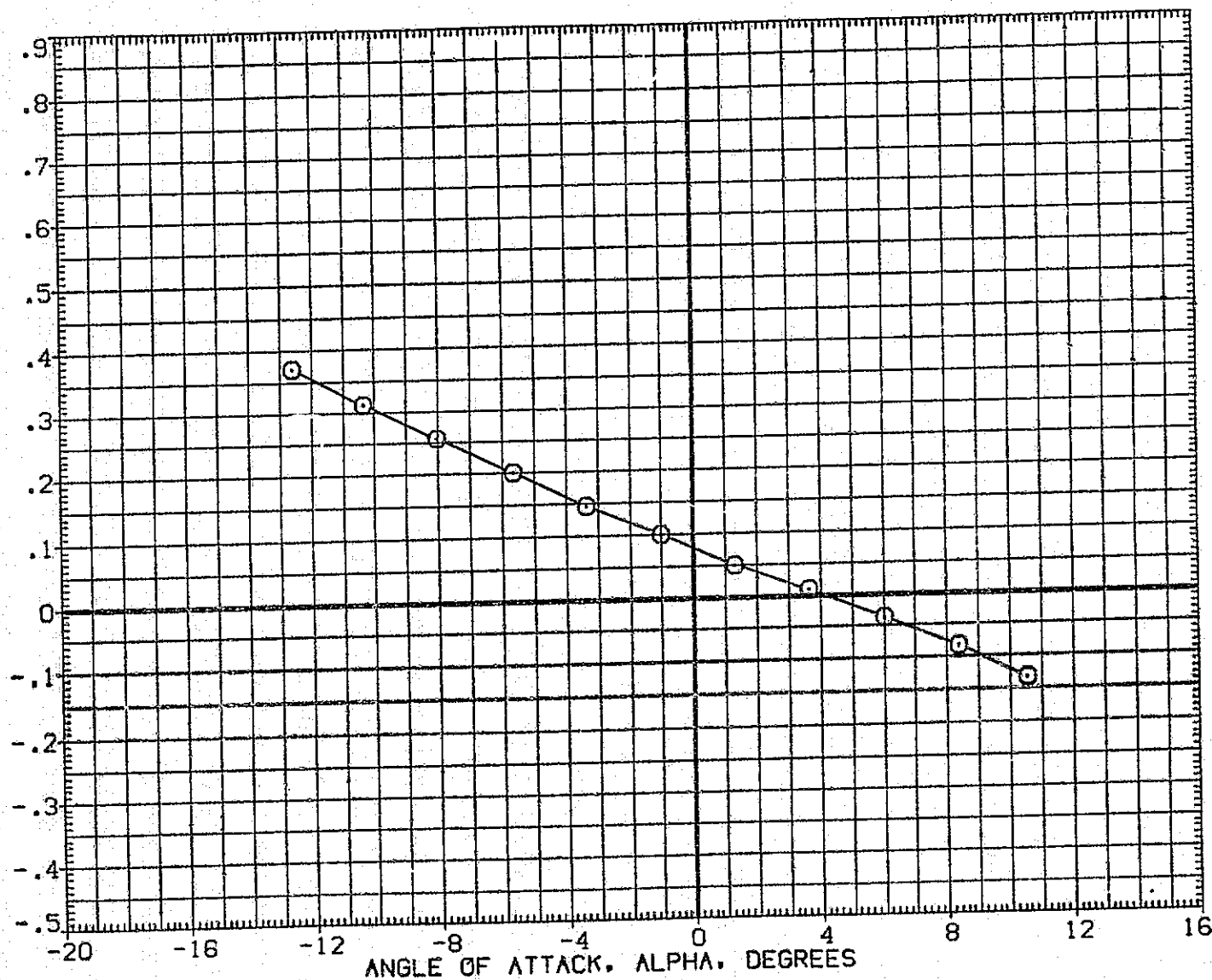


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)
(AIC011)	MSFC 594(1A33) 740TS (TIP1SIP201)
(AIC014)	MSFC 594(1A33) 740TS (TIP1SIP201)

ORB STING	RUDDER
ORB STING	.000
ORB STING	-15.000
ORB STING	-20.000

REFERENCE INFORMATION		
SREF	269.0000	SQ. FT
LREF	1250.0000	IN.
BREF	1250.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

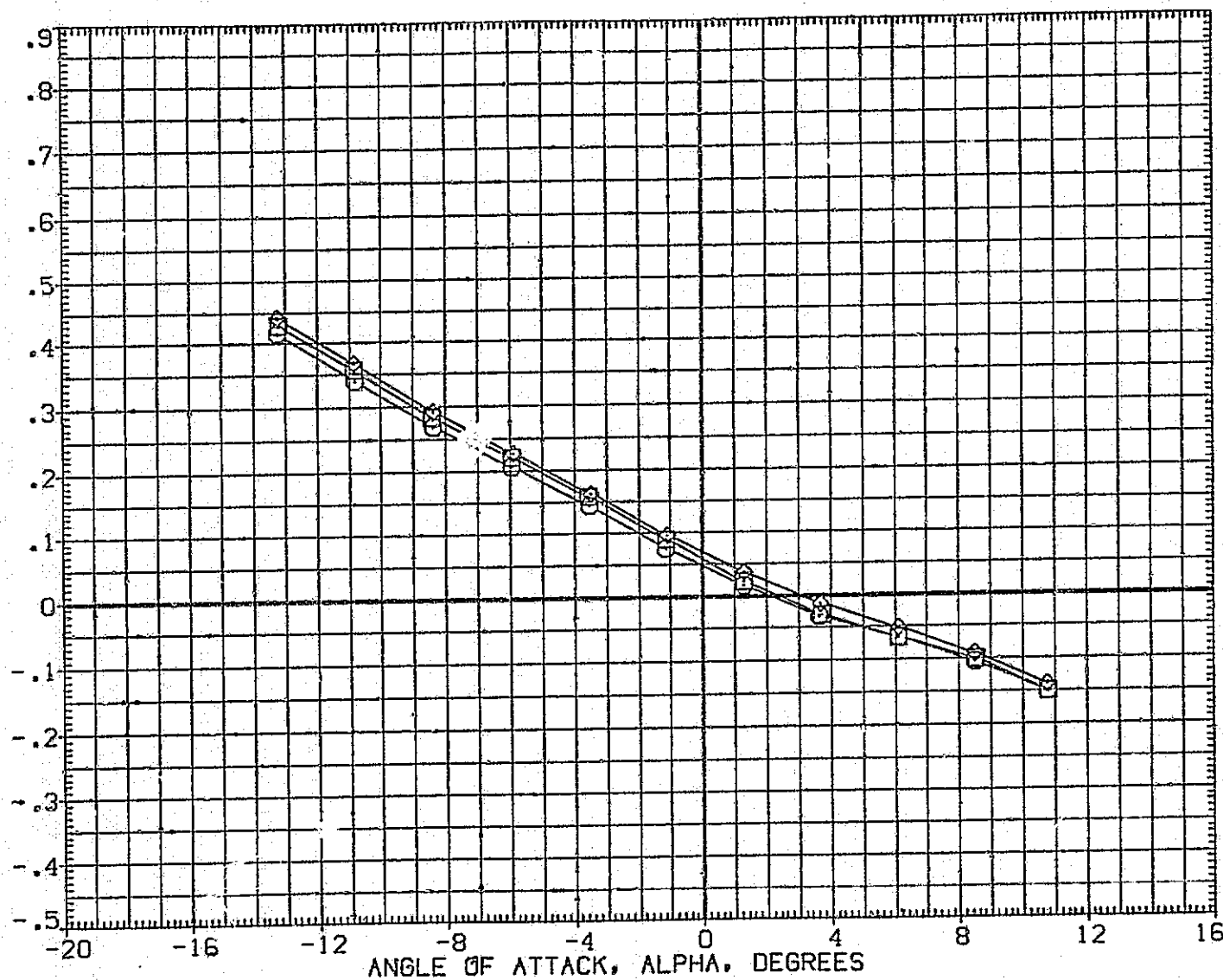


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(C)MACH = .91

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC007)	MSFC 59411A33) 740TS (TIPISIP201)
(AIC011)	DATA NOT AVAILABLE
(AIC014)	DATA NOT AVAILABLE

OR8 STING	RUDDER
	.000
	-15.000
	-20.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

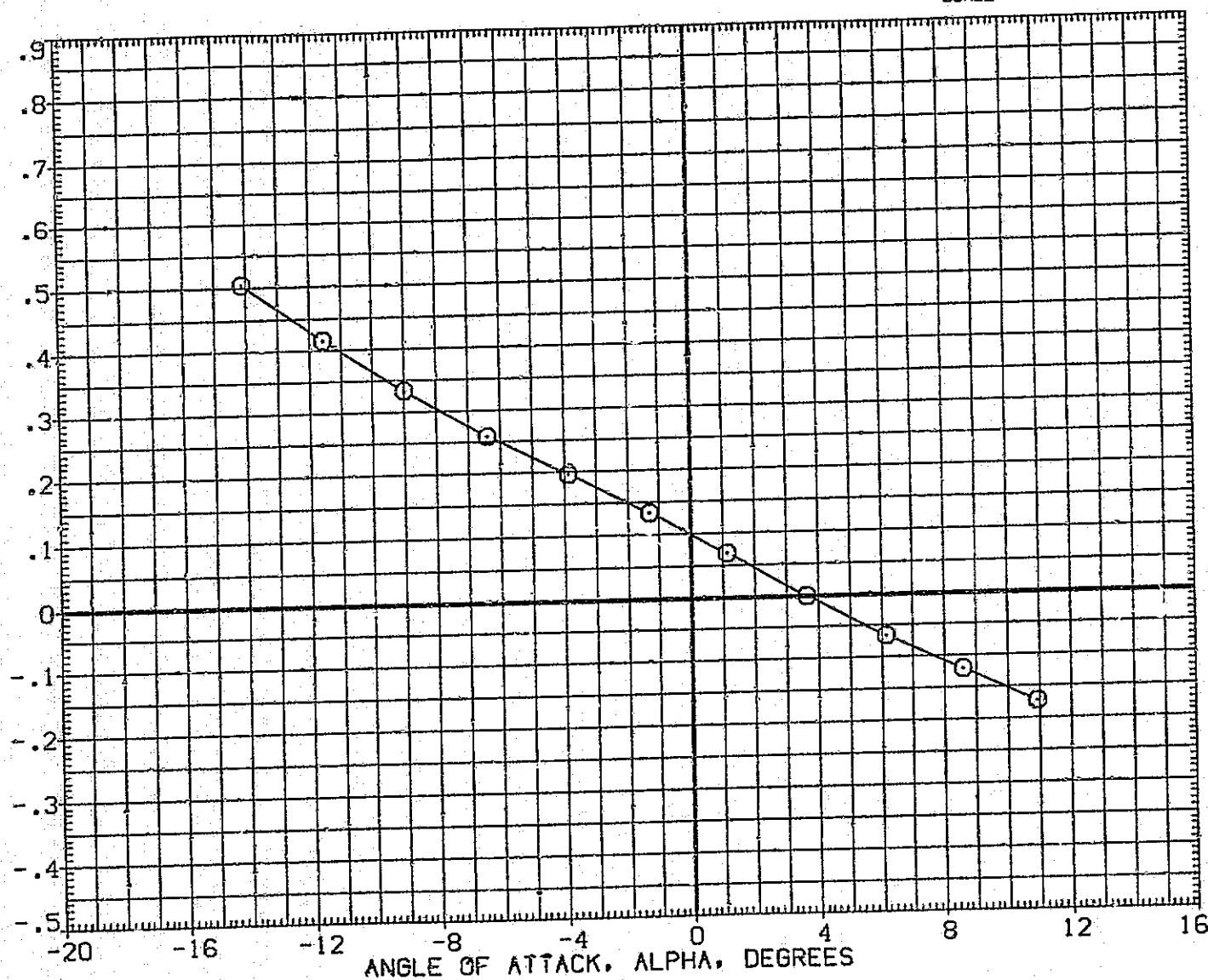


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AICD07)	MSFC 594(1A33) 740TS (TIPIS1P201)
(AICD11)	MSFC 594(1A33) 740TS (TIPIS1P201)
(AICD14)	MSFC 594(1A33) 740TS (TIPIS1P201)

ORB STING	RUDDER
ORB STING	.000
ORB STING	-15.000
ORB STING	-20.000

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

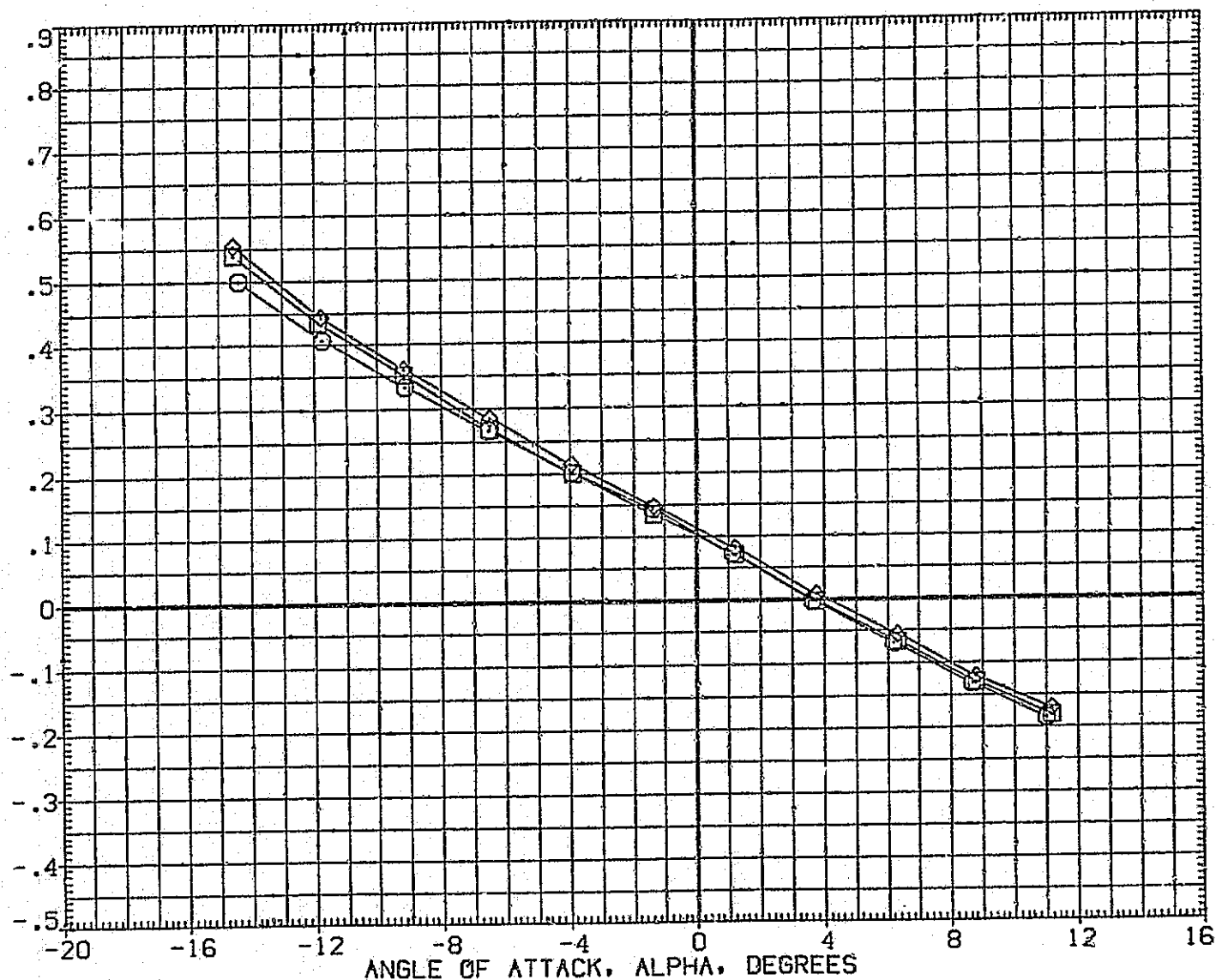


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)
(AIC011)	MSFC 594(1A33) 740TS (TIP1SIP201)
(AIC014)	MSFC 594(1A33) 740TS (TIP1SIP201)

RUDDER
ORB STING .000
ORB STING -15.000
ORB STING -20.000

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

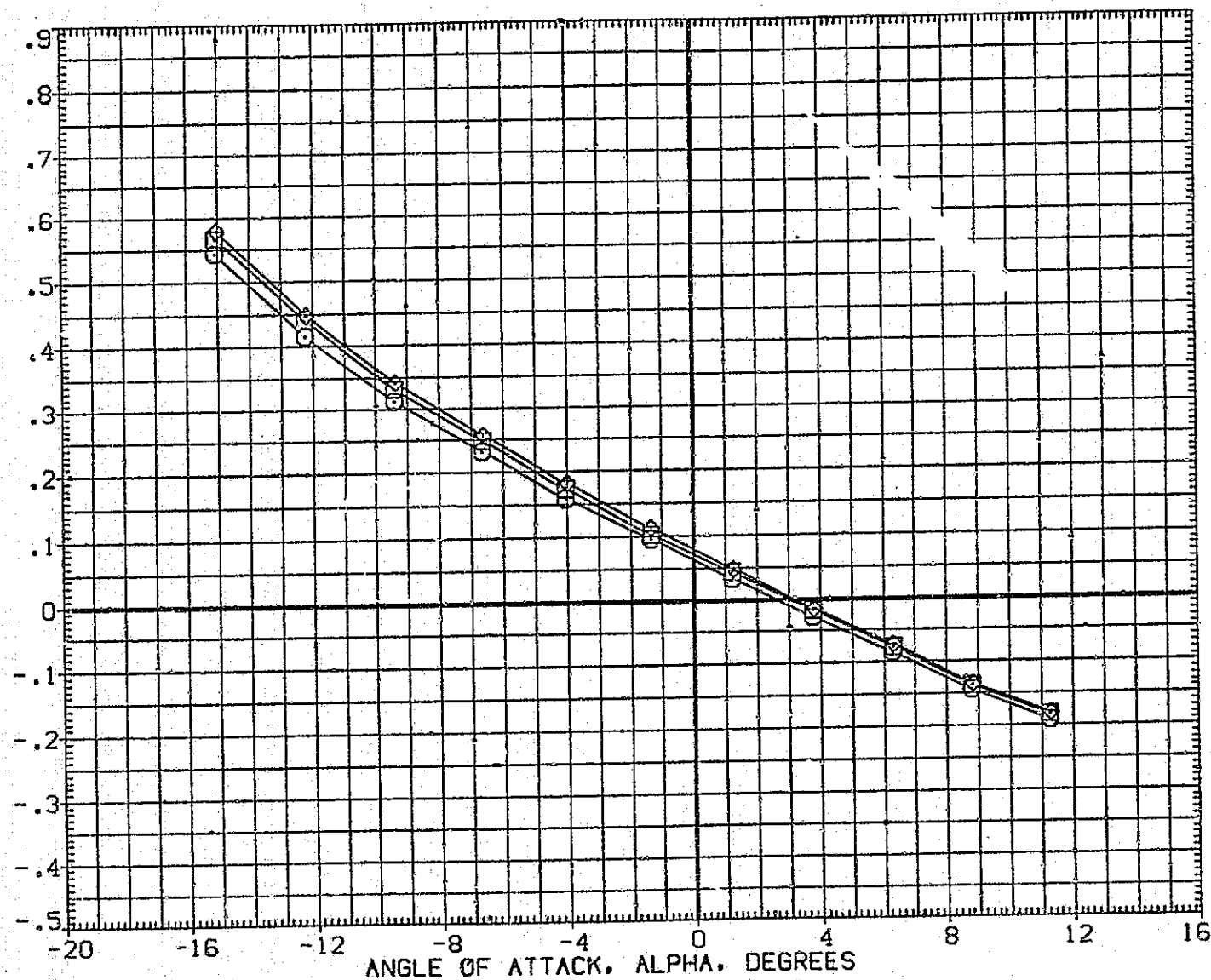


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(F)MACH = 1.25

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (AIC007) MSFC 594(1A33) 740TS (TIPISIP201)
 (AIC011) DATA NOT AVAILABLE
 (AIC014) DATA NOT AVAILABLE

ORB STING

RUDDER
 .000
 -15.000
 -20.000

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

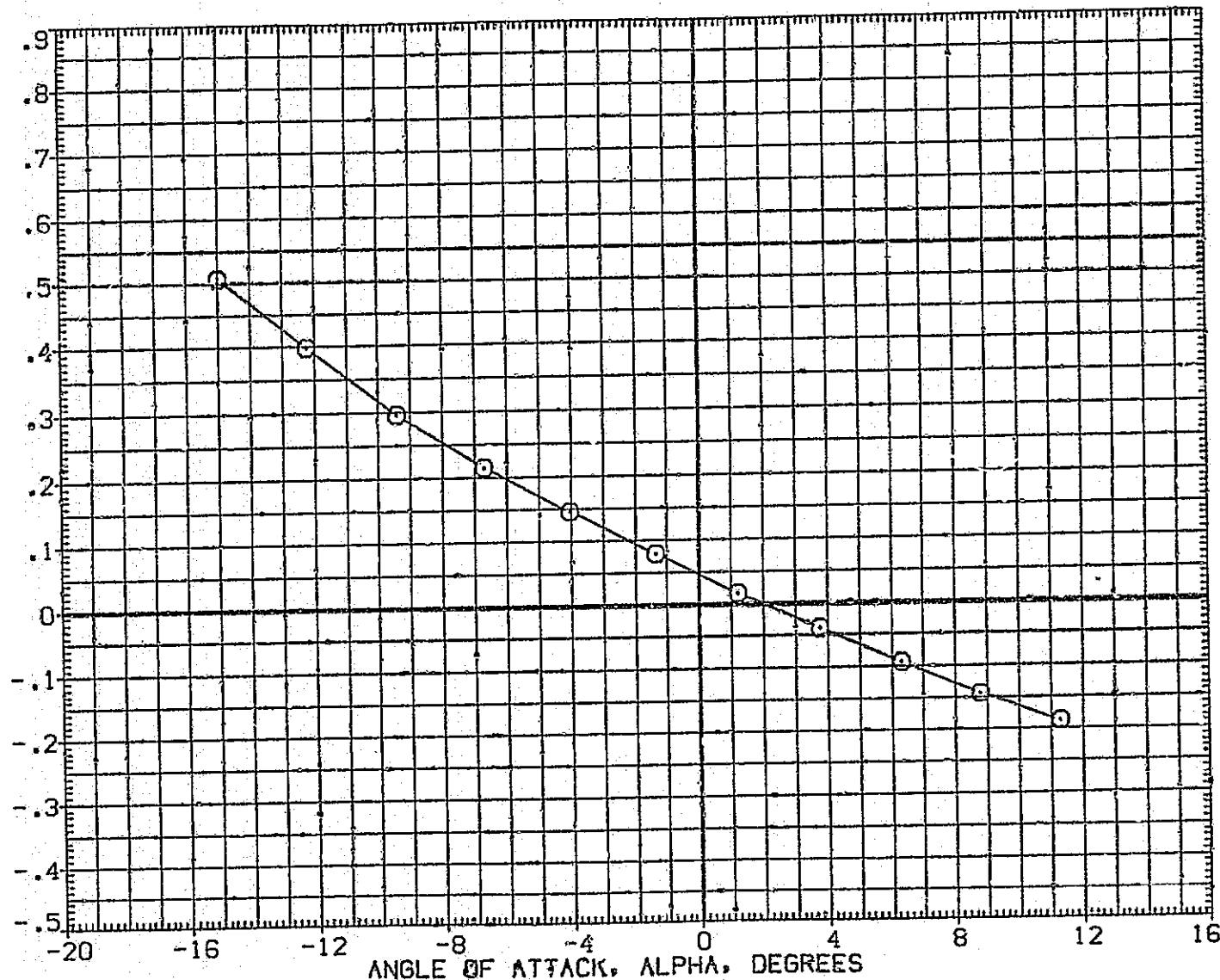


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (G)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC011)	MSFC 594(1A33) 740TS (TIPISIP201)
(AIC014)	MSFC 594(1A33) 740TS (TIPISIP201)

ORB STING	RUDDER
ORB STING	.000
ORB STING	-15.000
ORB STING	-20.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1280.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

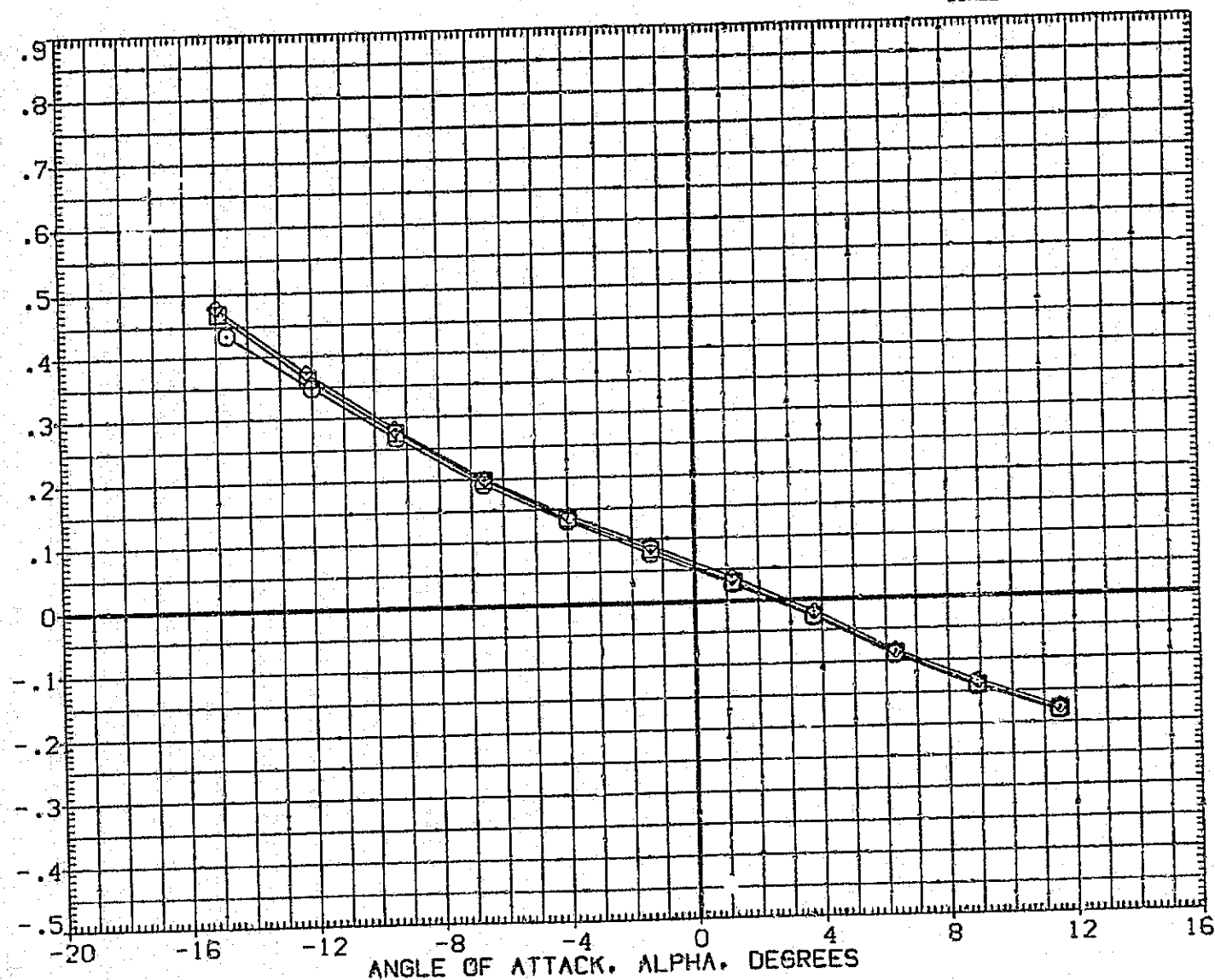


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(M)MACH = 1.97

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (AIC007) □ MSFC S94(1A33) 740YS (T1PISIP201)
 (AIC011) □ DATA NOT AVAILABLE
 (AIC014) □ DATA NOT AVAILABLE

ORB STING RUDDER
 .000
 -15.000
 -20.000

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

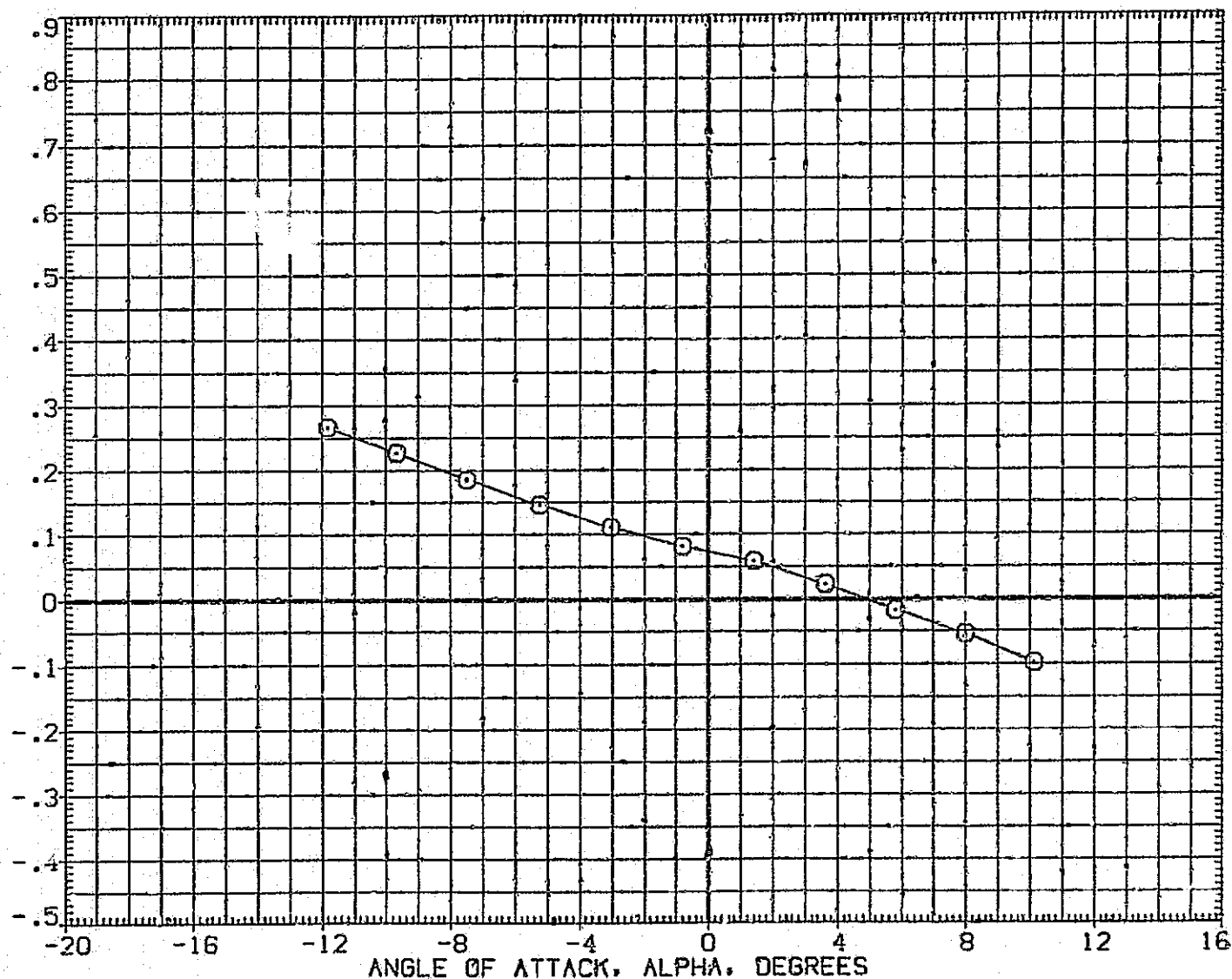


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(1)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	RUDDER
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING .000
(AIC011)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING -15.000
(AIC014)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING -20.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY PITCHING MOMENT COEFFICIENT, CLMF

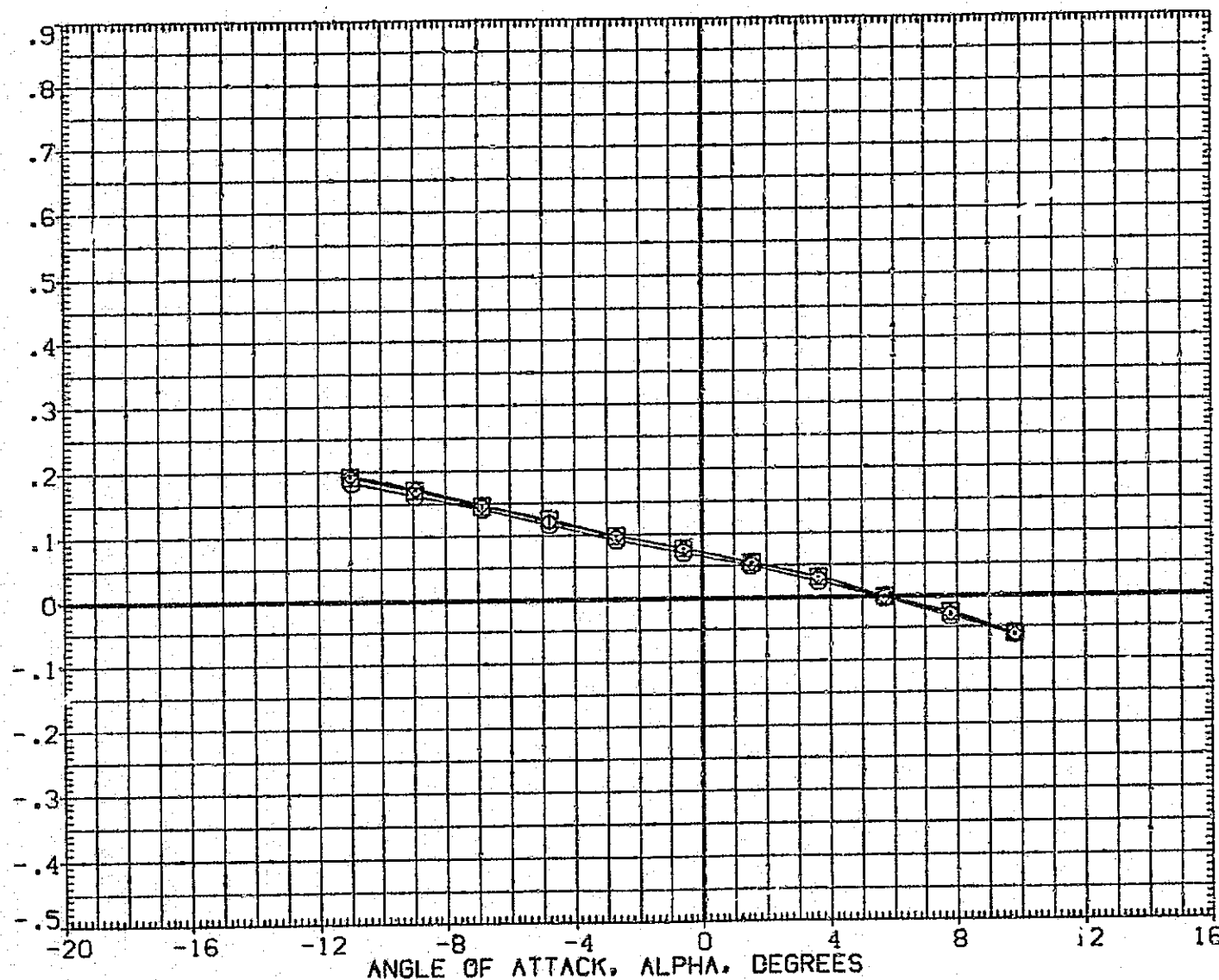


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(J)MACH = 4.96

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC007)	MSFC 594(A33) 740TS (TIP(S)P201)
(AIC011)	MSFC 594(A33) 740TS (TIP(S)P201)
(AIC014)	MSFC 594(A33) 740TS (TIP(S)P201)

RUDGER
ORB STING .000
ORB STING -15.000
ORB STING -20.000

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. YT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. YT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

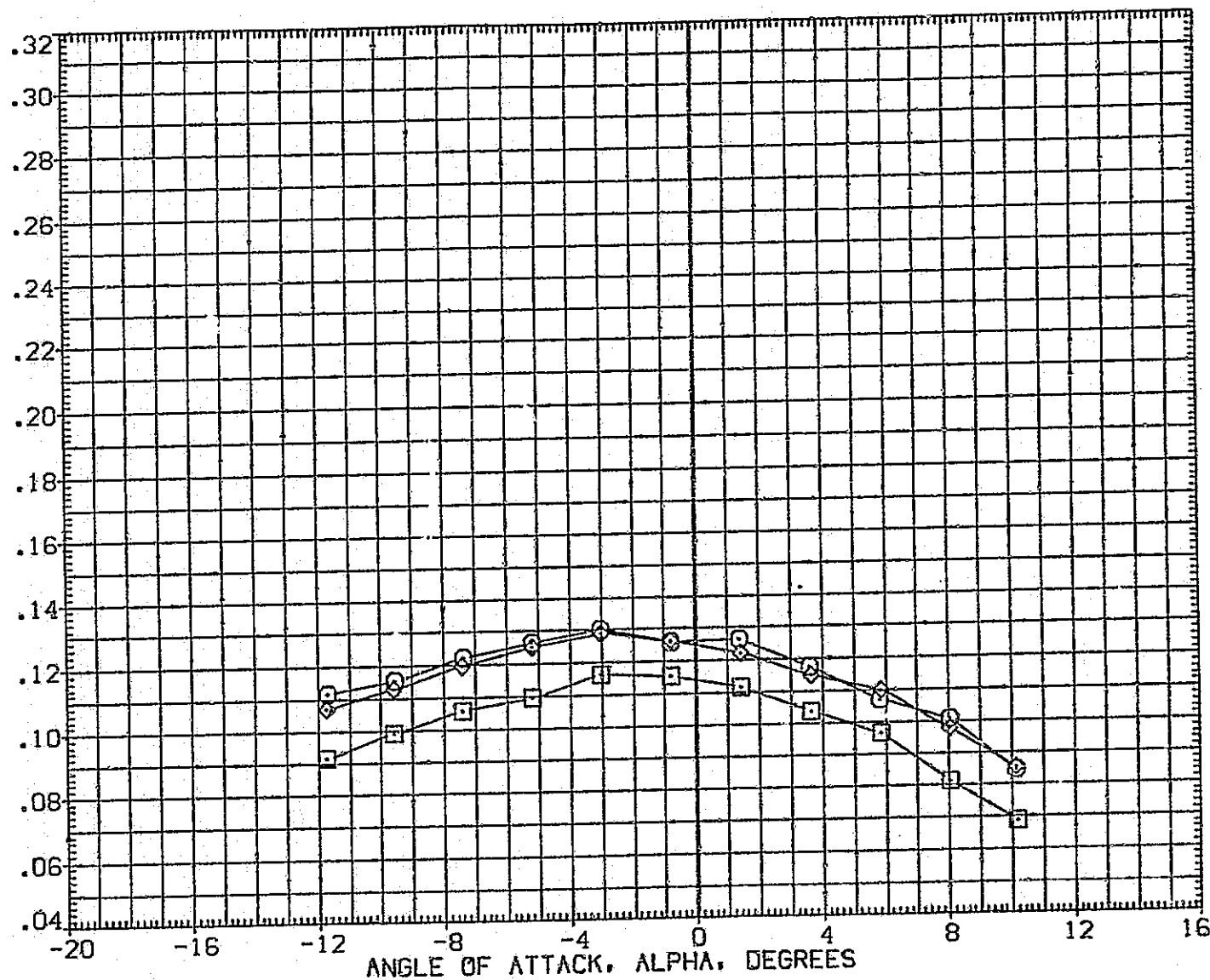


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(A)MACH = .60

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
[AICD07] □	MSFC 594(1A33) 740TS (TIP1SIP201)
[AICD11] □	DATA NOT AVAILABLE
[AICD14] ◇	DATA NOT AVAILABLE

ORB STING	RUDDER
	.000
	-15.000
	-20.000

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

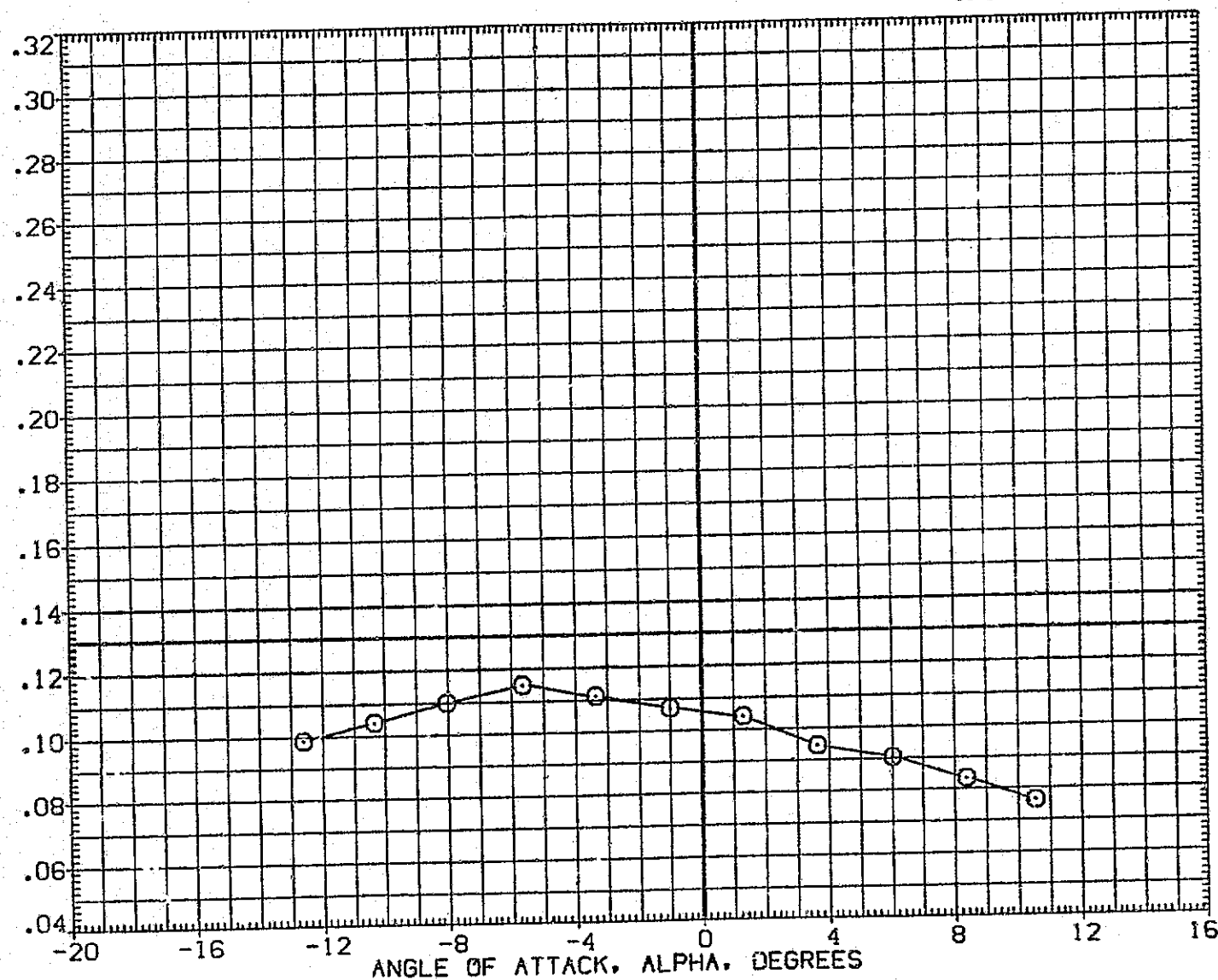


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(B)MACH = .80

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC007)	MSFC 594(1A33) 740TS (TIP:SlP201)
(AIC011)	MSFC 594(1A33) 740TS (TIP:SlP201)
(AIC014)	MSFC 594(1A33) 740TS (TIP:SlP201)

ORB STING	RUDEK
ORB STING	.000
ORB STING	-15.000
ORB STING	-20.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

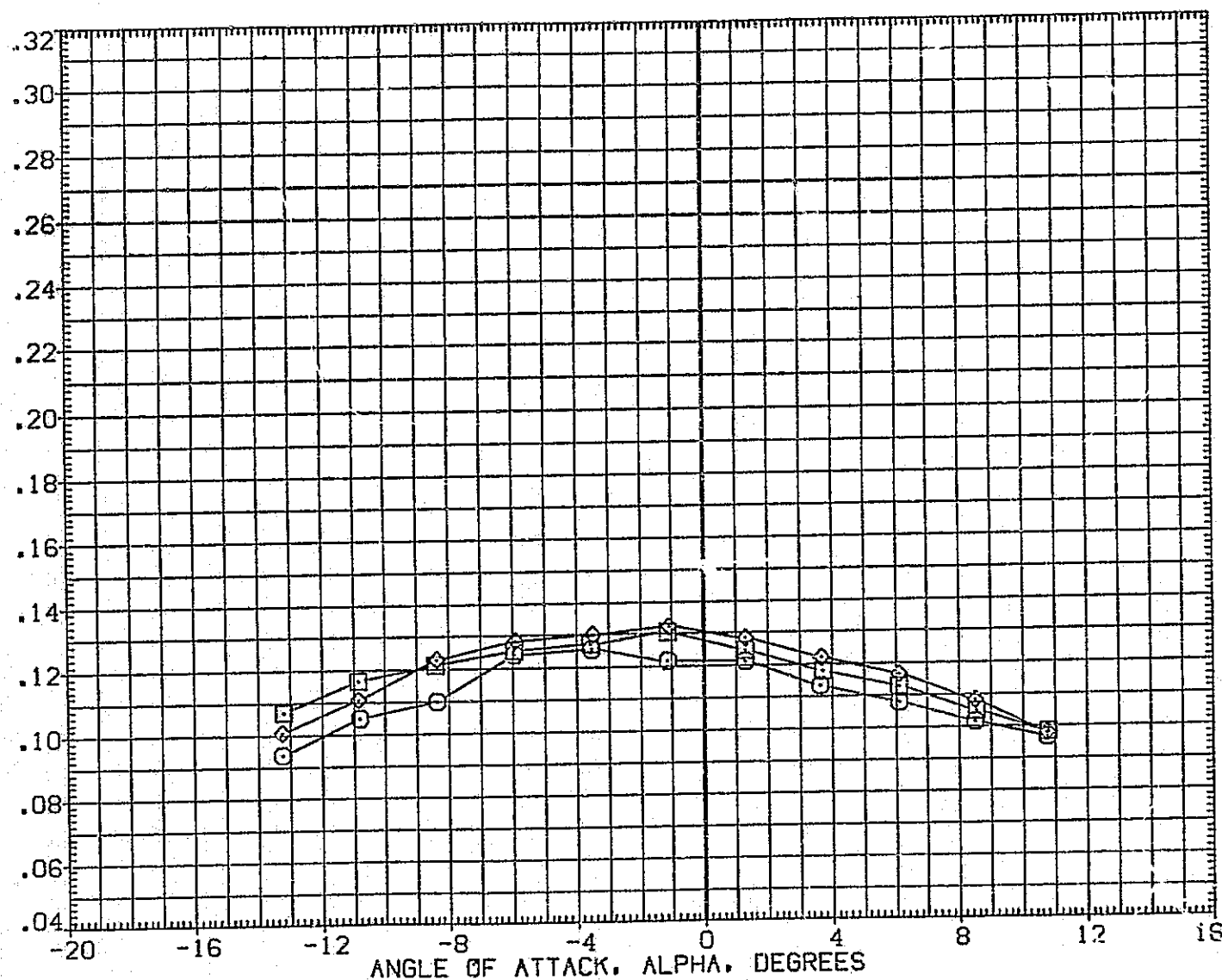





FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(C)MACH = .91

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (AIC007)  MSFC 594(1A33) 740TS (TIPISIP201)
 (AIC011)  DATA NOT AVAILABLE
 (AIC014)  DATA NOT AVAILABLE

ORB STING

RUDDER
 .000
 -15.000
 -20.000

REFERENCE INFORMATION

SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

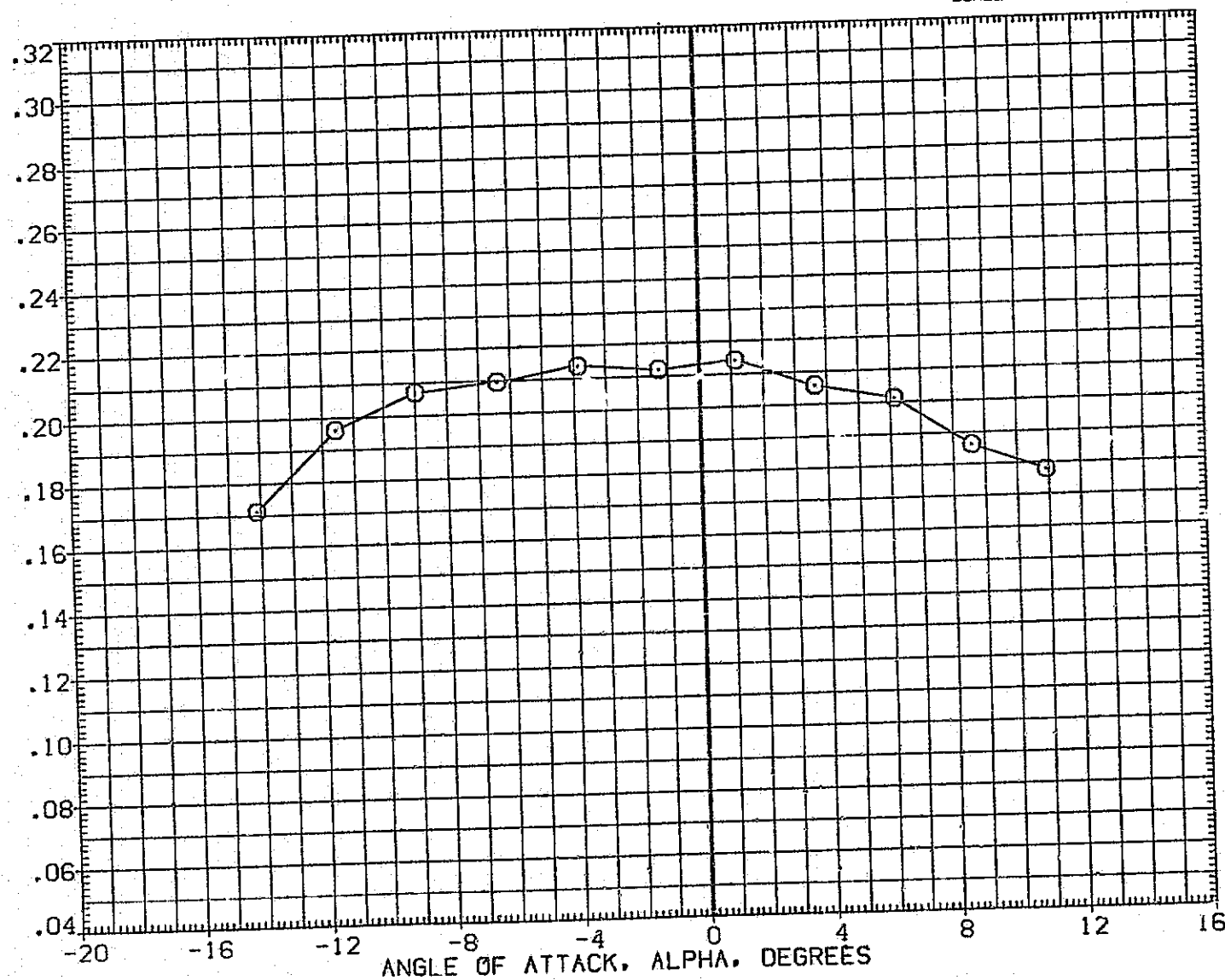


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (D)MACH = 1.05

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	RUDDER
[AIC007]	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING .000
[AIC011]	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING -15.000
[AIC014]	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING -20.000

REFERENCE INFORMATION		
SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0010	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

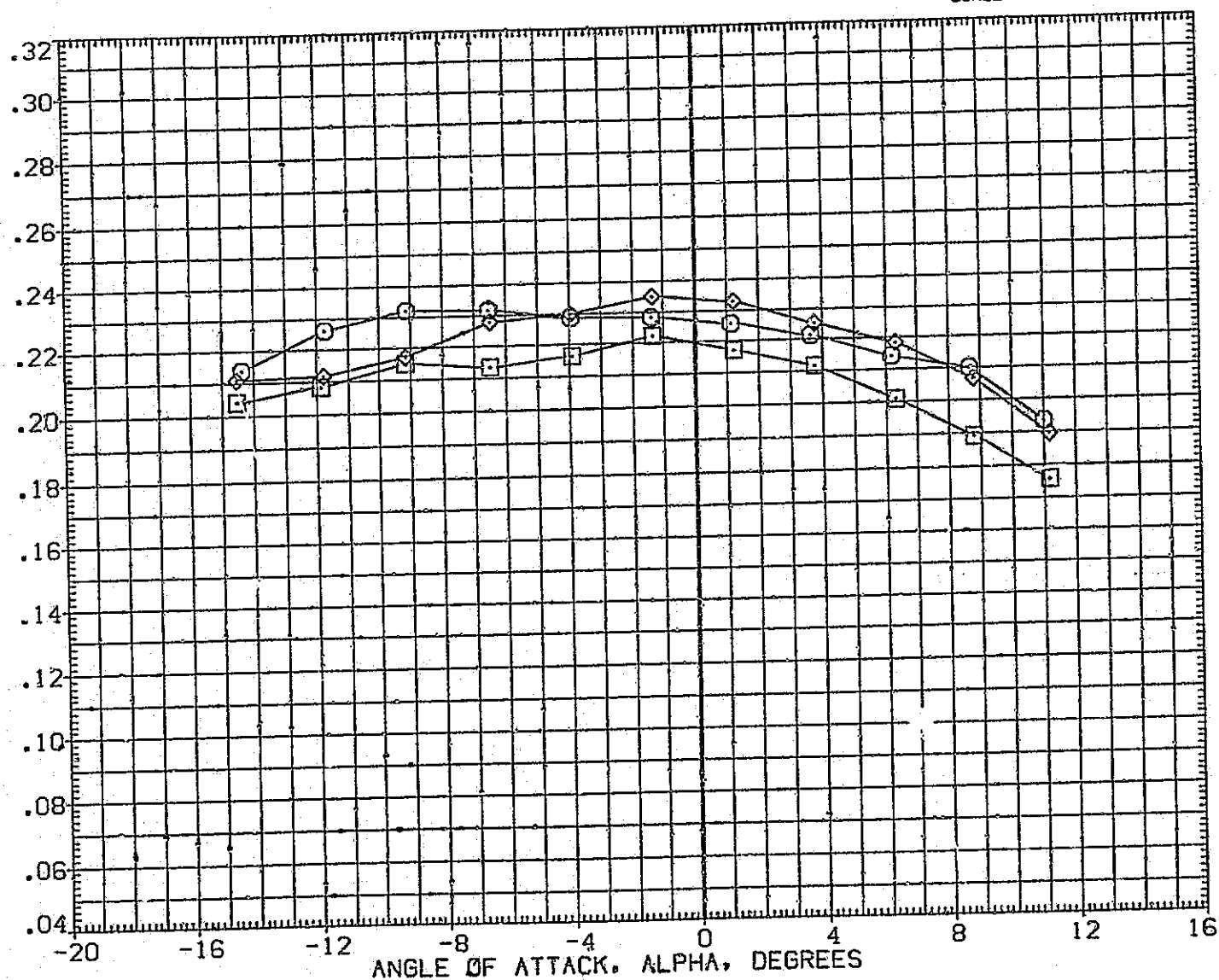


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(E)MACH = 1.10

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	RUDDER
(AIC007)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING .000
(AIC011)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING -15.000
(AIC014)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING -20.000

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

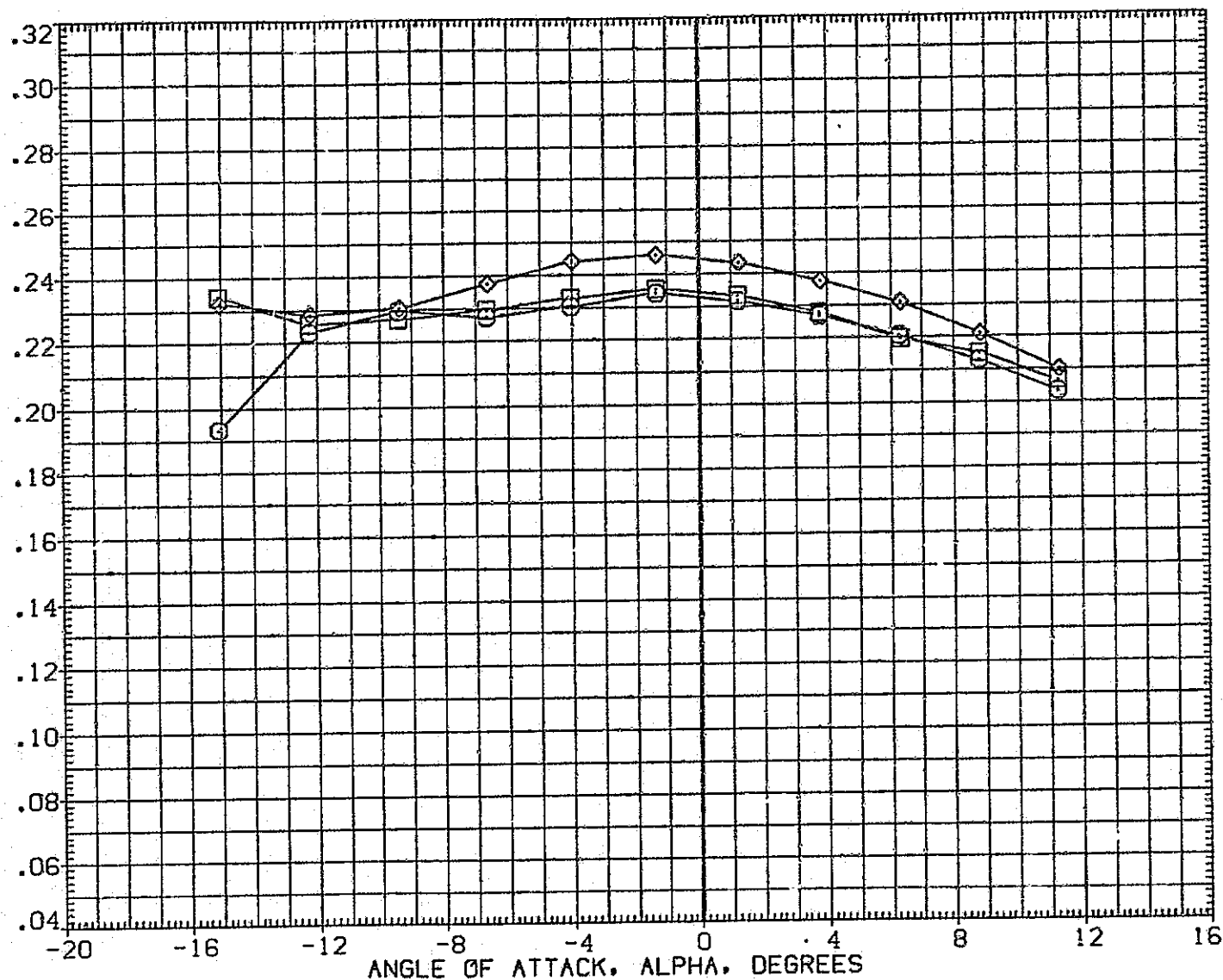


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(CF)MACH = 1.25

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (AICD07) \square MSFC 594(1A33) 740TS (TIPISIP201)
 (AICD11) \square DATA NOT AVAILABLE
 (AICD14) \diamond DATA NOT AVAILABLE

ORB STING

RUDDER
 .000
 -15.000
 -20.000

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

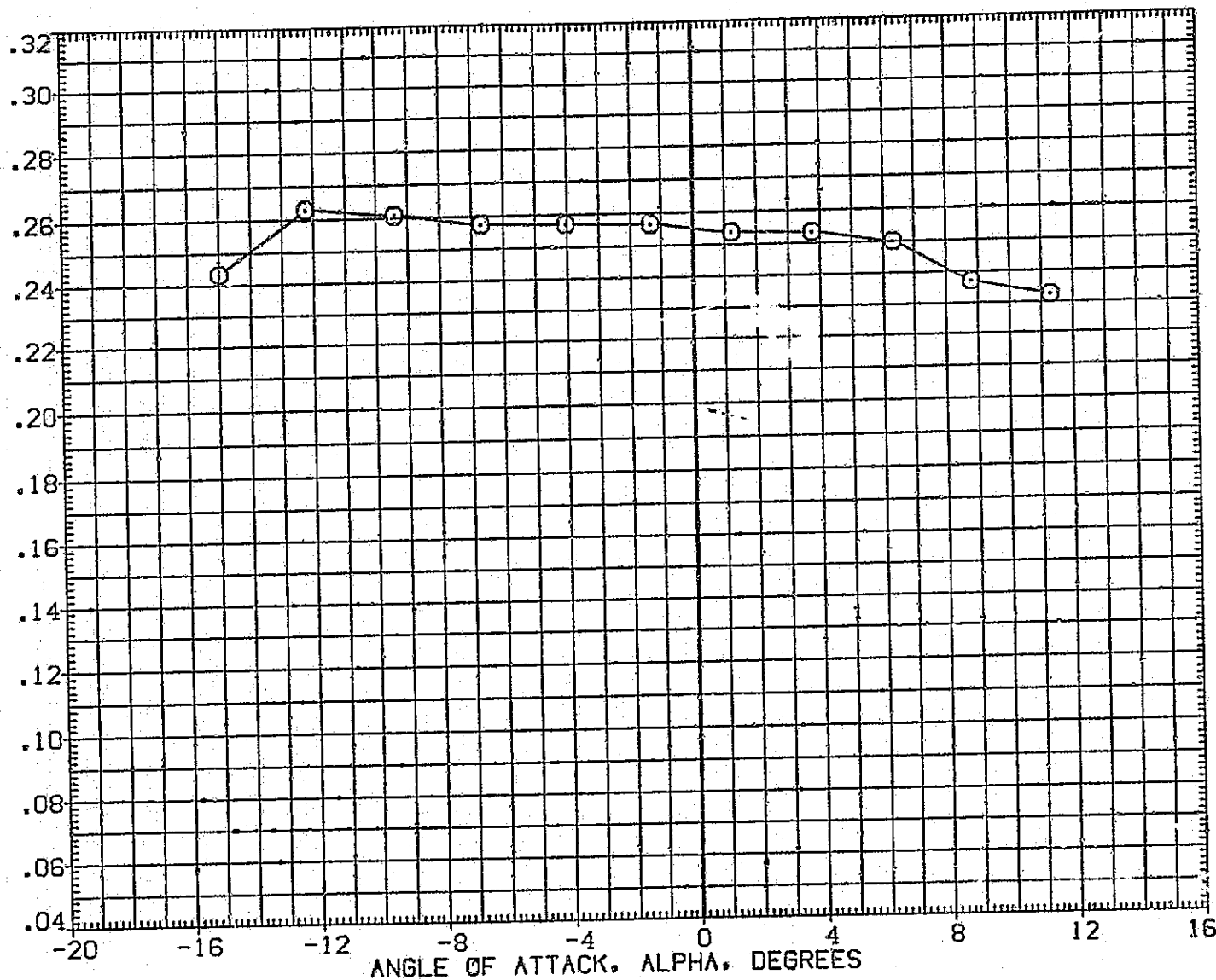


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (G)MACH = 1.46

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
(AIC007)	MSFC 594(1A33) 740TS (TIP1SIP201)
(AIC011)	MSFC 594(1A33) 740TS (TIP1SIP201)
(AIC014)	MSFC 594(1A33) 740TS (TIP1SIP201)

ORR STING	RUDDER
ORR STING	.000
ORR STING	-15.000
ORR STING	-20.000

REFERENCE INFORMATION	
SREF	2690.0000 SQ. FT
LREF	1290.0000 IN.
BREF	1290.0000 IN.
XMRP	976.0000 IN. XT
YMRP	.0000 IN. YT
ZMRP	400.0000 IN. ZT
SCALE	.0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

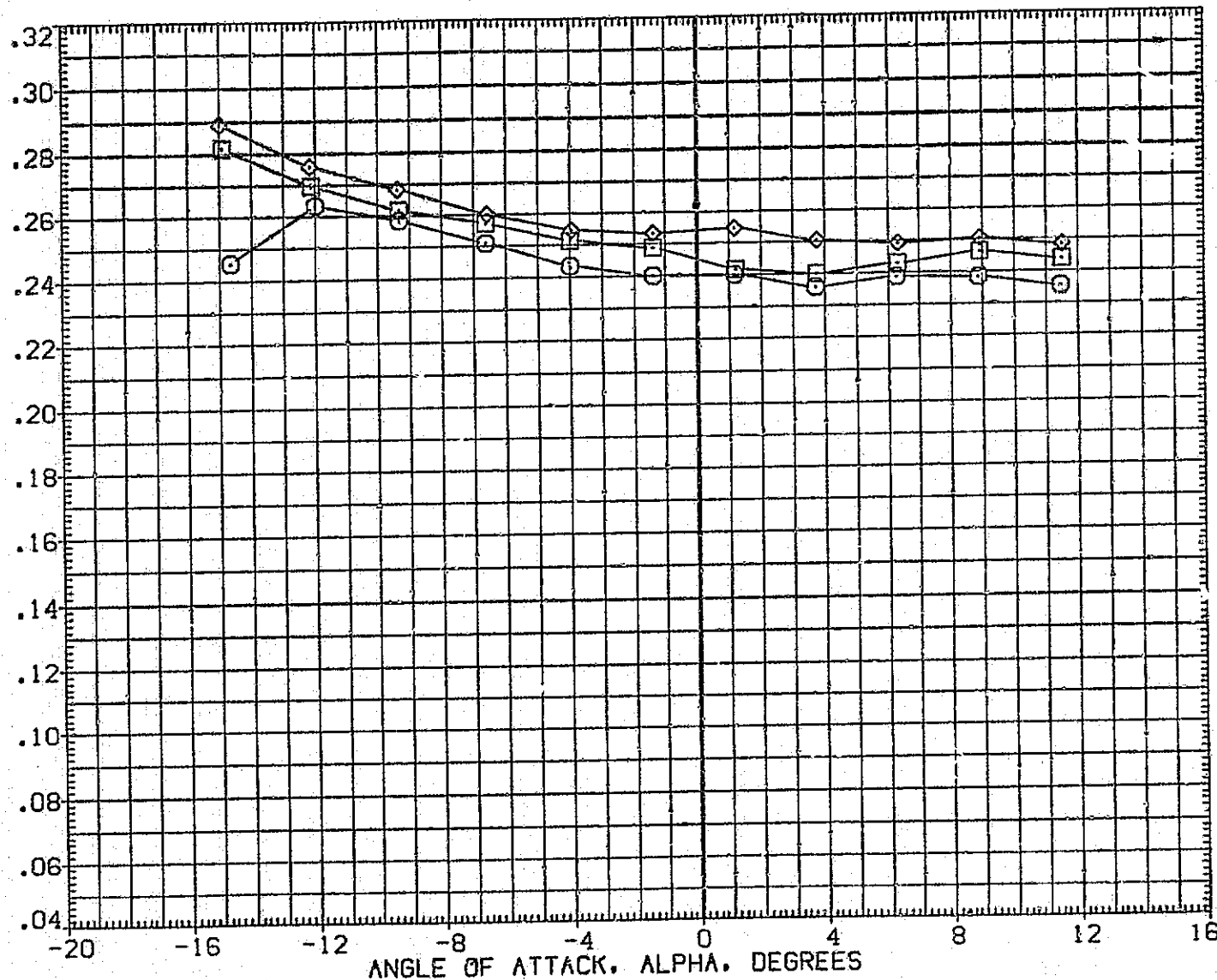


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(H)MACH = 1.97

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 {AIC007} □ MSFC 594(1A33) 740TS (TIPIS1P201)
 {AIC011} □ DATA NOT AVAILABLE
 {AIC014} ◇ DATA NOT AVAILABLE

ORB STING

RUDDER
 .000
 -15.000
 -20.000

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT, CAF

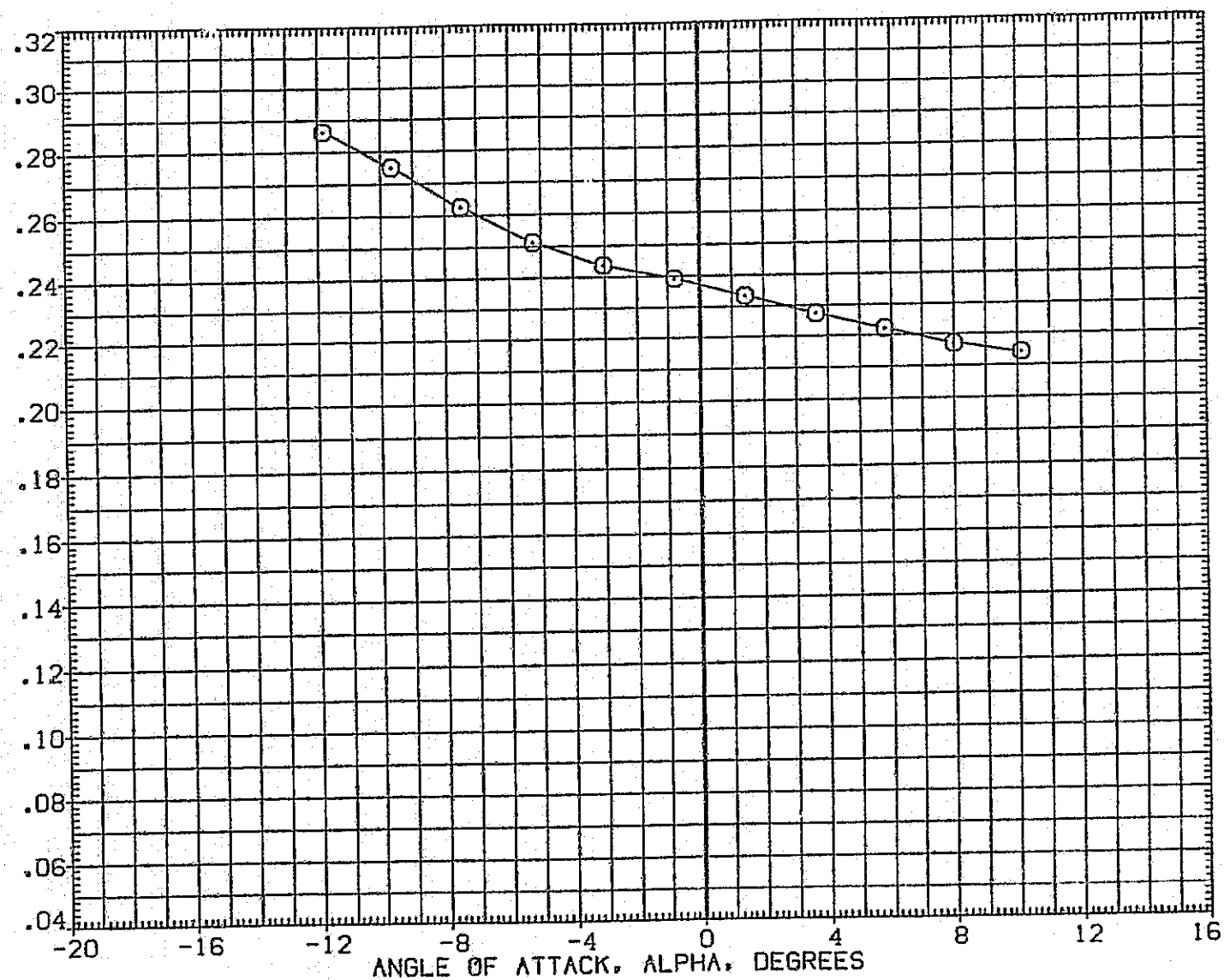


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(I)MACH = 2.99

DATA SET SYMBOL	CONFIGURATION DESCRIPTION
[A1C007]	MSFC 594(1A33) 740TS (T1P1S1P201)
[A1C011]	MSFC 594(1A33) 740TS (T1P1S1P201)
[A1C014]	MSFC 594(1A33) 740TS (T1P1S1P201)

ORR STING	RUDDER
ORR STING	.000
ORR STING	-15.000
ORR STING	-20.000

REFERENCE INFORMATION		
SREF	2680.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT, CAF

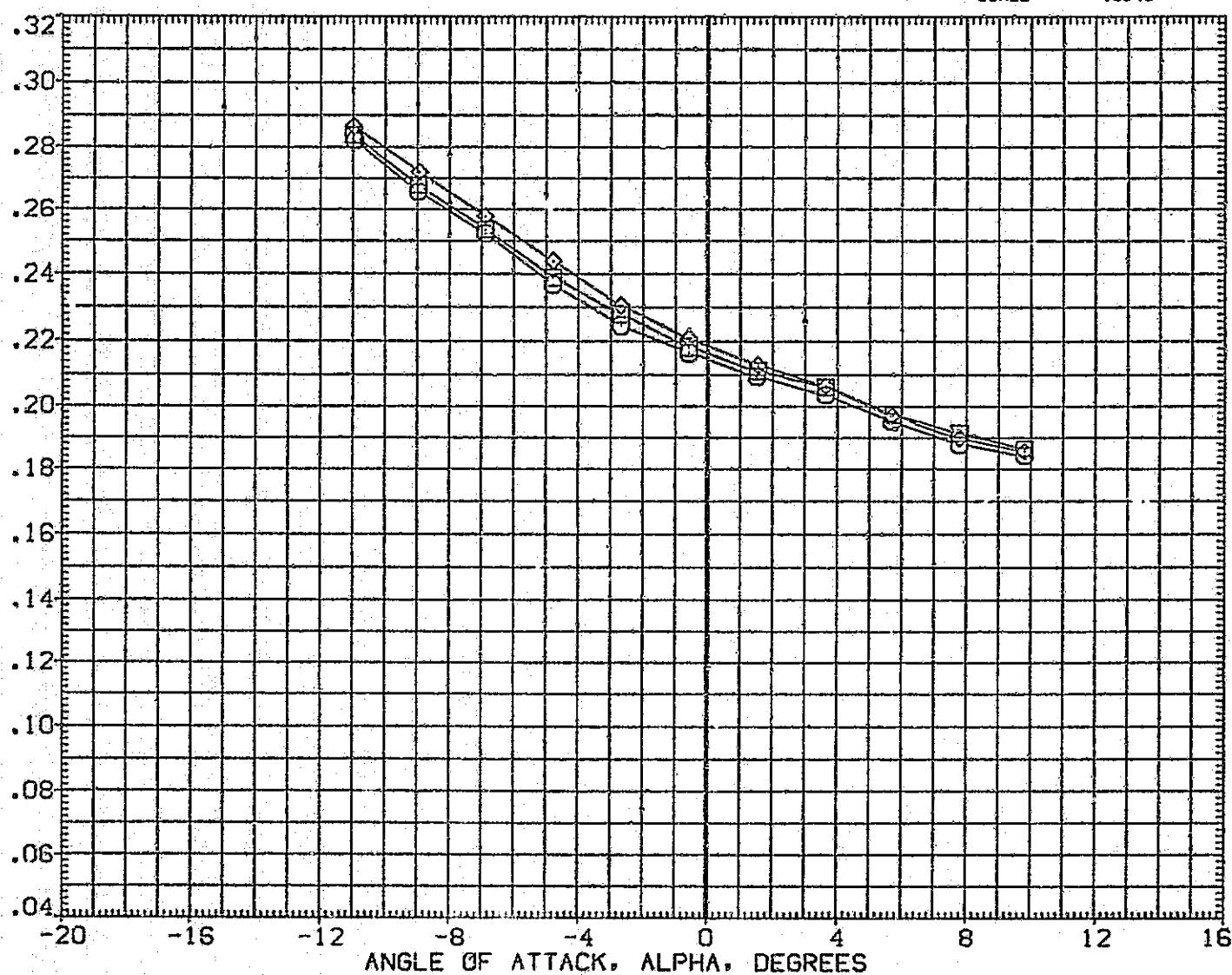


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(J)MACH = 4.96

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (C1C011) 8 MSFC 594(1A33) 740TS (T1P1S1P201)
 (C1C014) 8 MSFC 594(1A33) 740TS (T1P1S1P201)

ORB STING -15.000
 ORB STING -20.000

DRUDDR

REFERENCE INFORMATION
 SREF 2650.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

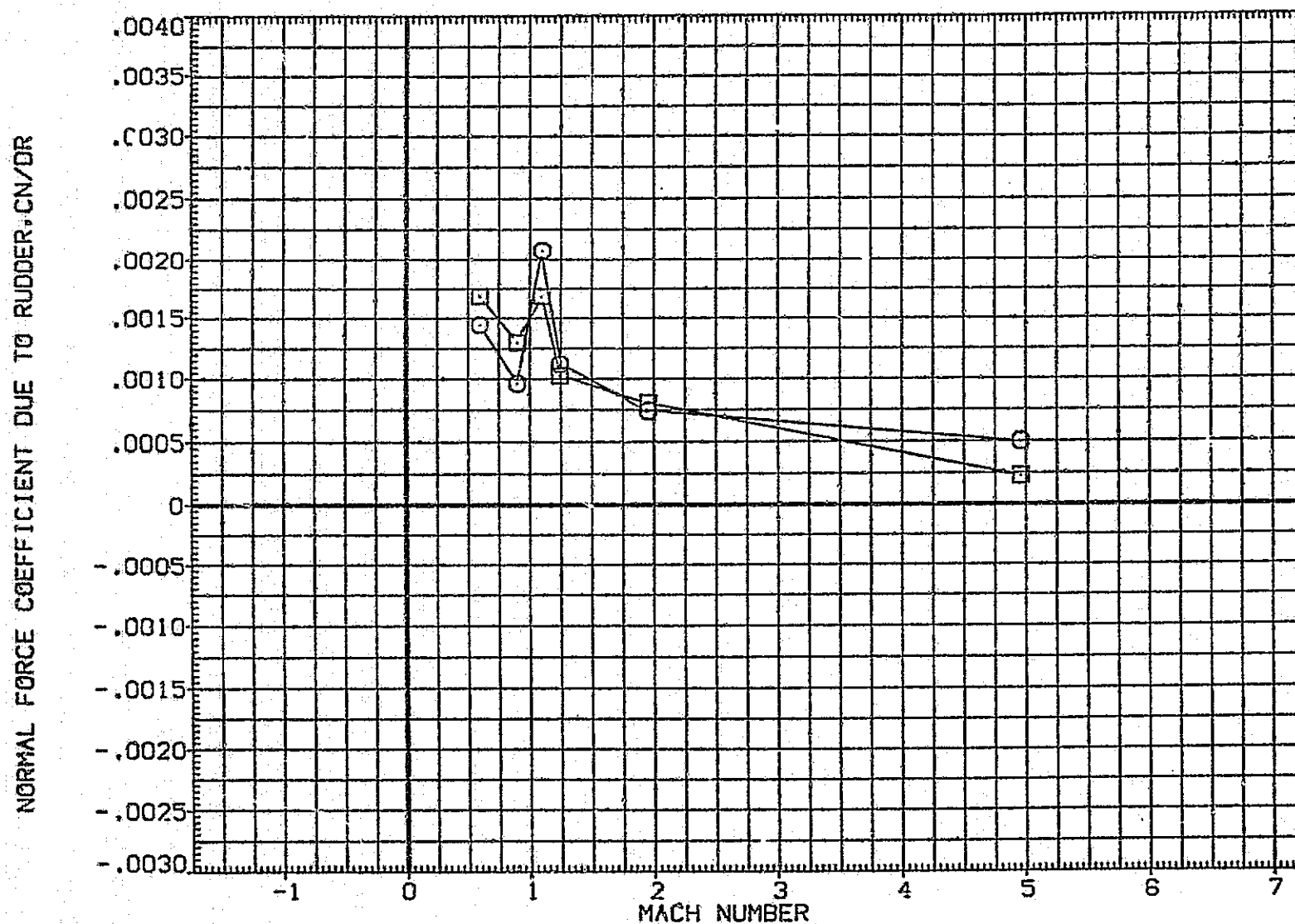




FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (A) ALPHA = -10.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (C1C011)  MSFC 594(1A33) 740TS (T1P1S1P201)
 (C1C014)  MSFC 594(1A33) 740TS (T1P1S1P201)

ORB STING DRUDDR
 ORB STING -15.000
 ORB STING -20.000

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 576.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

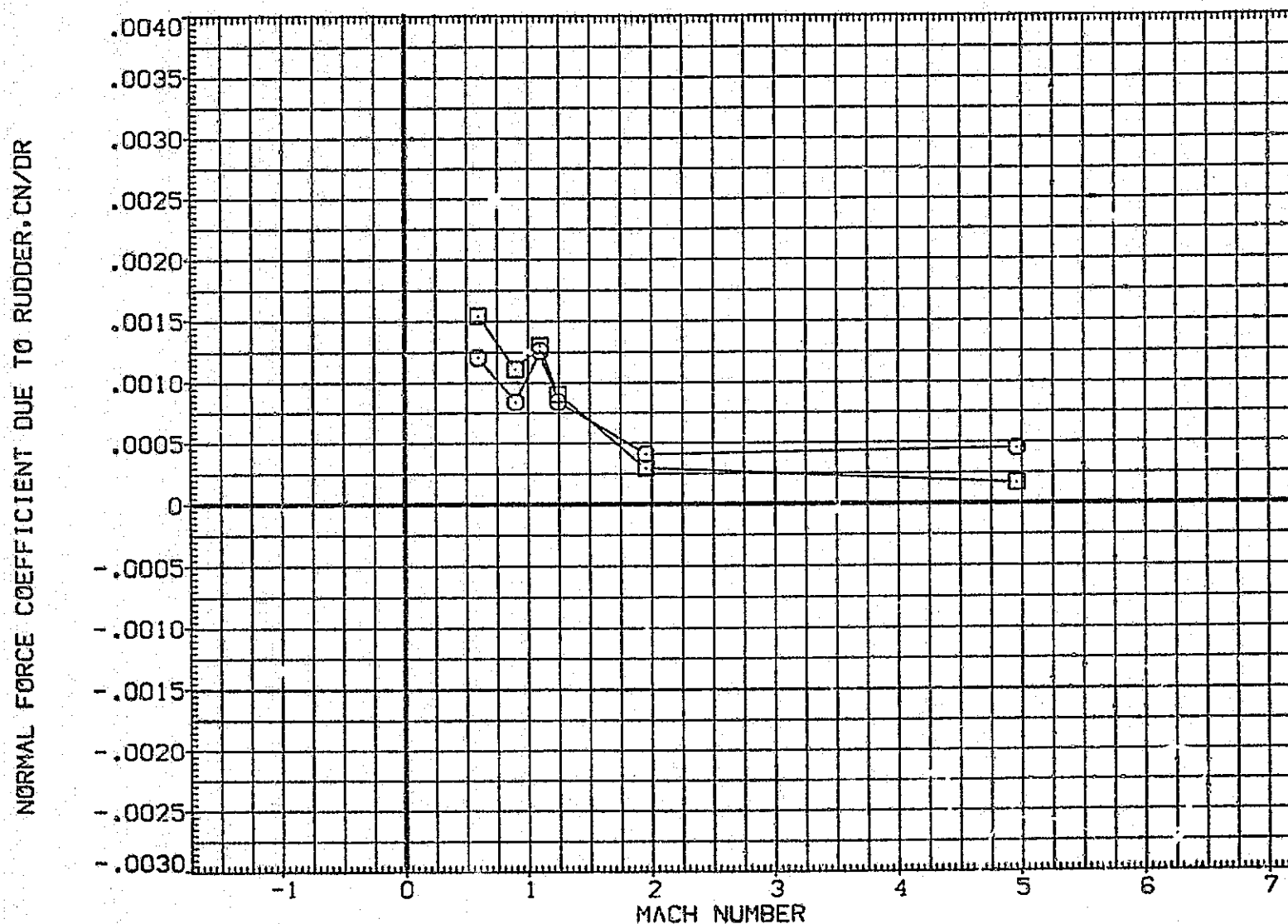




FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (B) ALPHA = -8.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (CIC011)  MSFC 594(1A33) 740TS (T1P1S1P201)
 (CIC014)  MSFC 594(1A33) 740TS (T1P1S1P201)

ORB STING -15.000
 ORB STING -20.000

DRUDDR

REFERENCE INFORMATION

SREF	2690.0000	SG. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

NORMAL FORCE COEFFICIENT DUE TO RUDDER, CN/DR

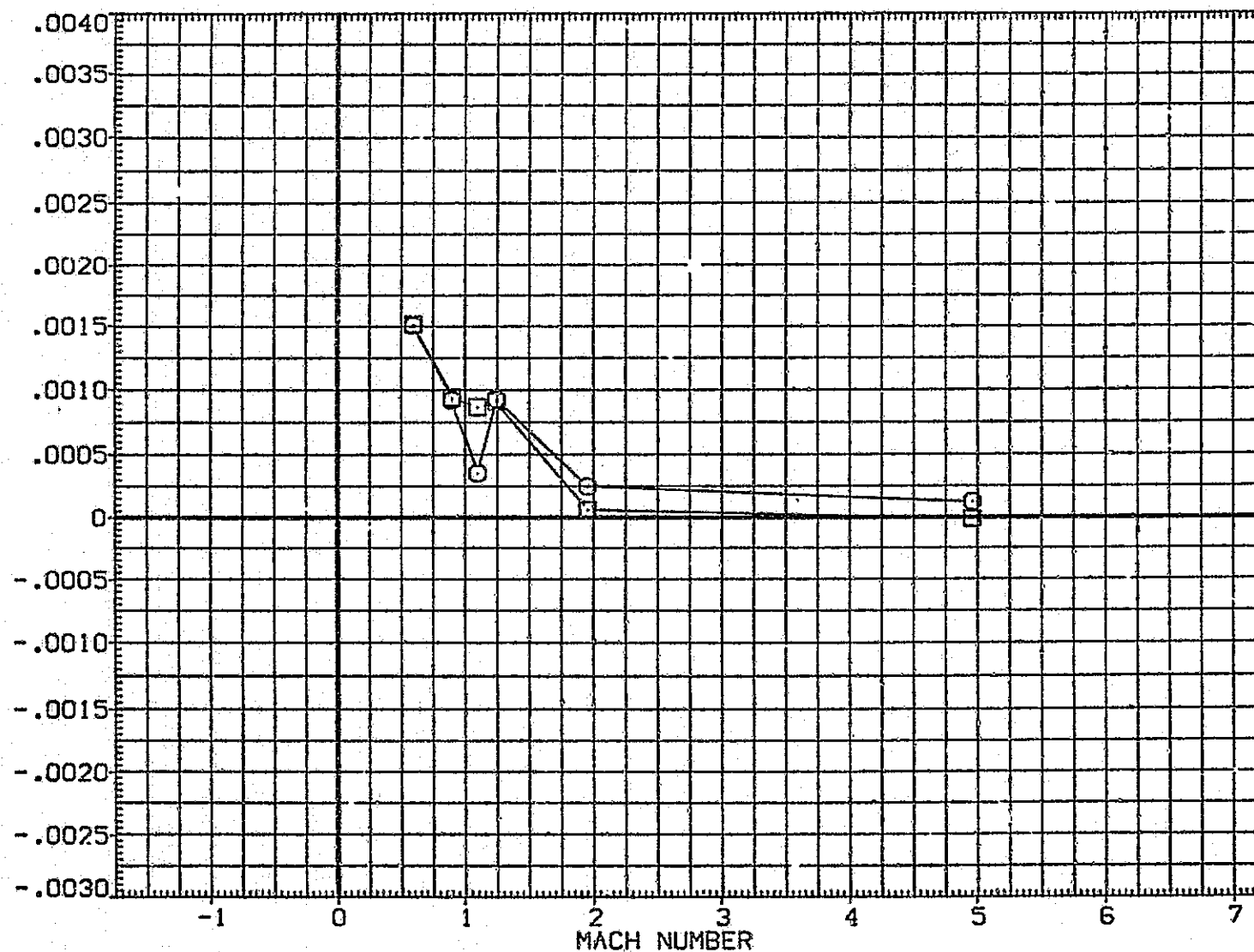


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(C) ALPHA = -6.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (C1C011) □ MSFC 594(1A33) 740TS (T1P1S1P201)
 (C1C014) □ MSFC 594(1A33) 740TS (T1P1S1P201)

ORB STING -15.000
 ORB STING -20.000

DRUDDR

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT DUE TO RUDDER, CN/DR

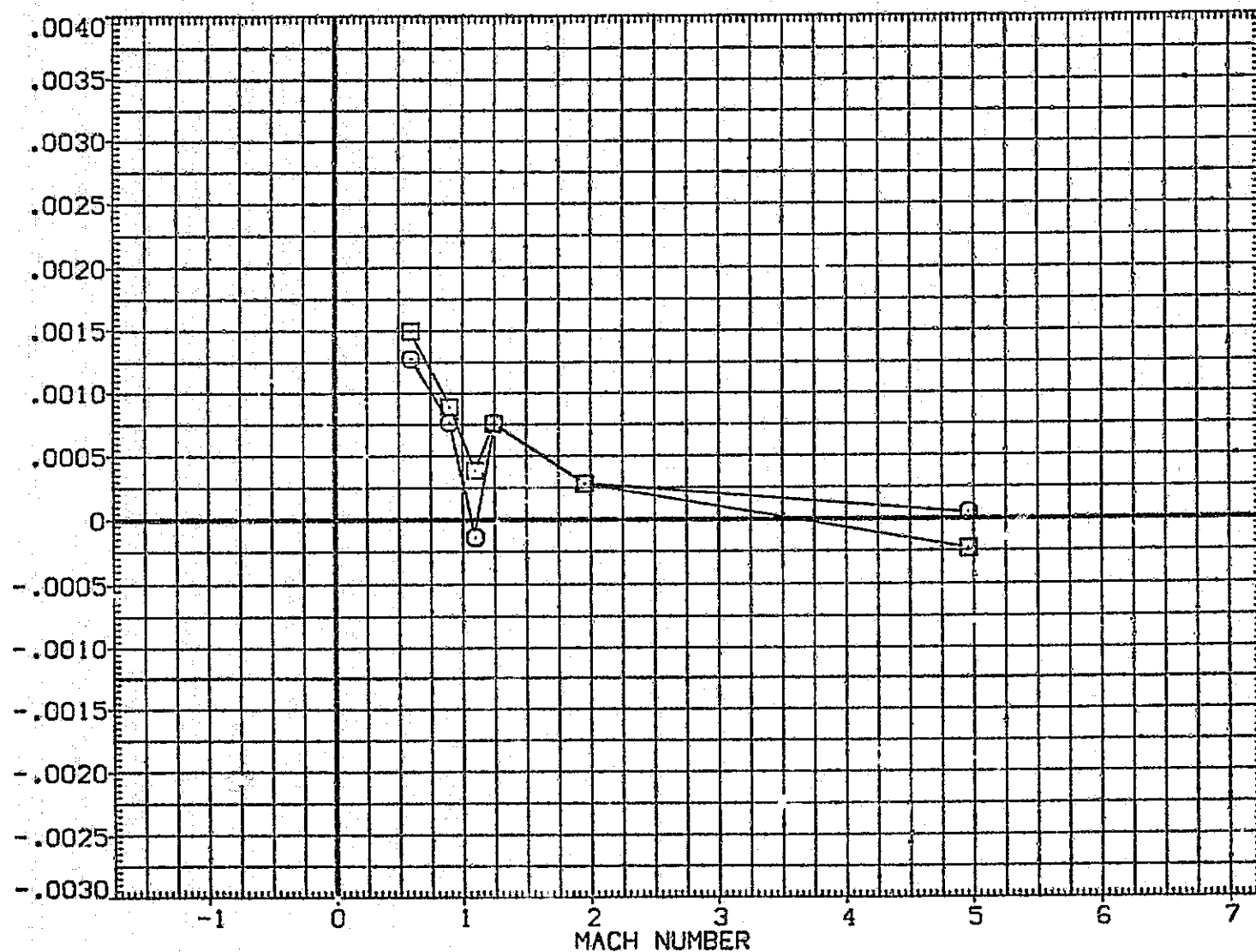


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (D) ALPHA = -4.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (CIC011) MSFC 594(1A33) 740TS (T1P1S1P201)
 (CIC014) MSFC 594(1A33) 740TS (T1P1S1P201)

ORB STING DRUDDR
 ORB STING -15.000
 ORB STING -20.000

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT DUE TO RUDDER, CN/DR

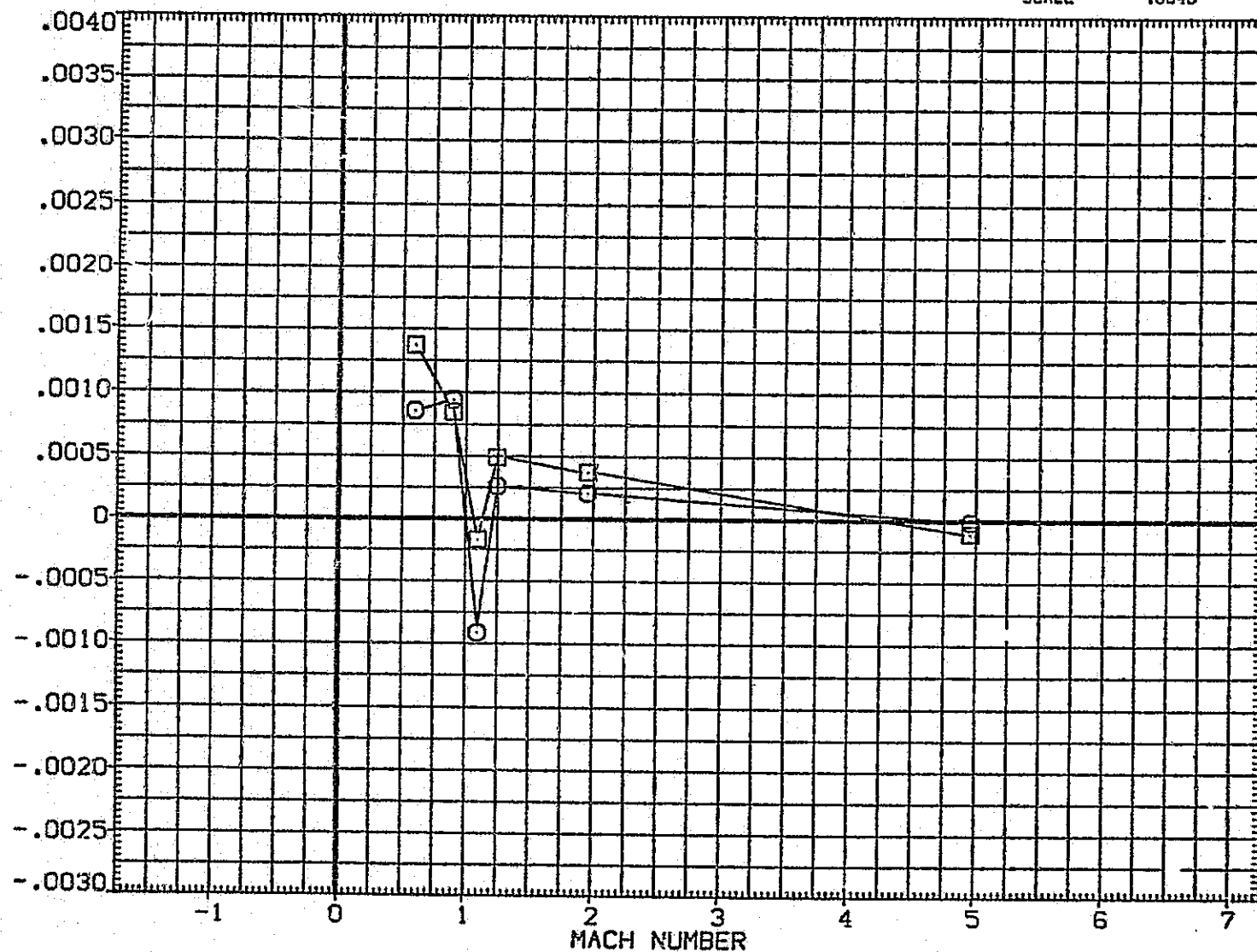


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (E)ALPHA = -2.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 [C1C011] MSFC 594(1A33) 740TS (T1P1S1P201)
 [C1C014] MSFC 594(1A33) 740TS (T1P1S1P201)

ORB STING DRUDDR
 ORB STING -15.000
 ORB STING -20.000

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

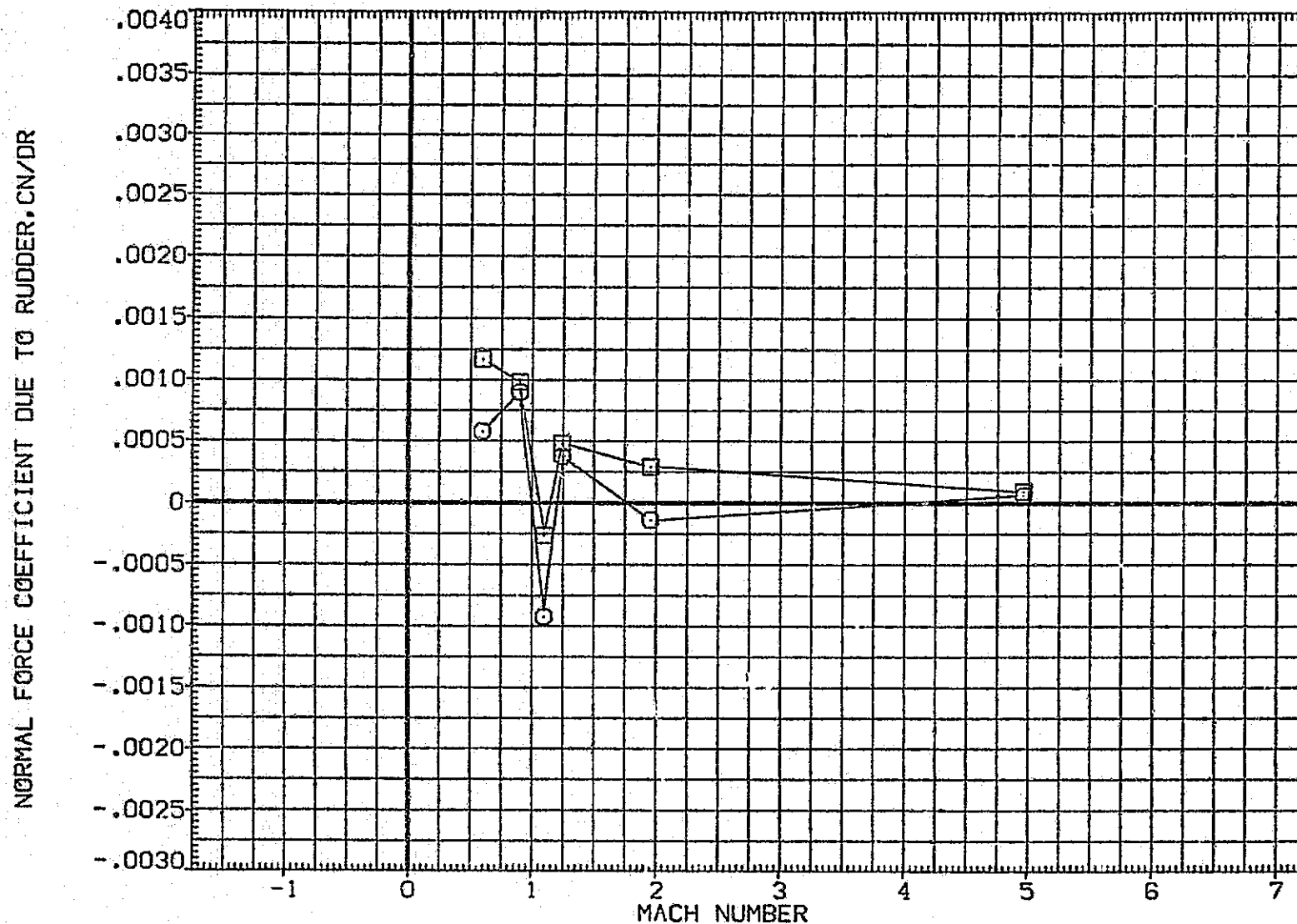


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(FJALPHA = .00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (CIC011) MSFC 594(IA33) 740TS (TIP1SIP201)
 (CIC01A) MSFC 594(IA33) 740TS (TIP1SIP201)

ORB STING -15.000
 ORB STING -20.000

DRUDDR

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT DUE TO RUDDER, CN/DR

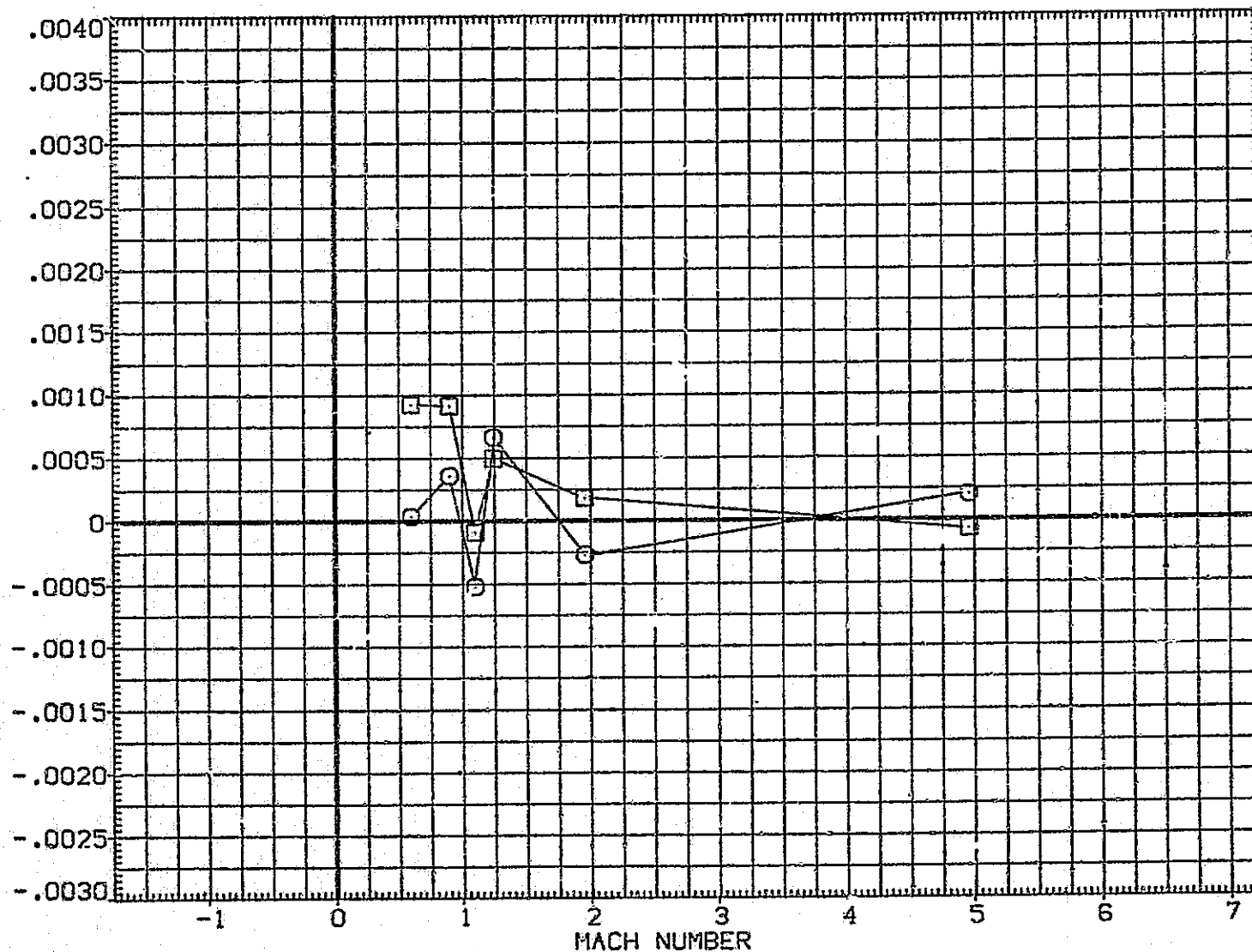


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (G) ALPHA = 2.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (C1C011) ☐ MSFC 594(1A33) 740TS (T1P1S1P201)
 (C1C014) ☐ MSFC 594(1A33) 740TS (T1P1S1P201)

ORB STING DRUDDR
 ORB STING -15.000
 ORB STING -20.000

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

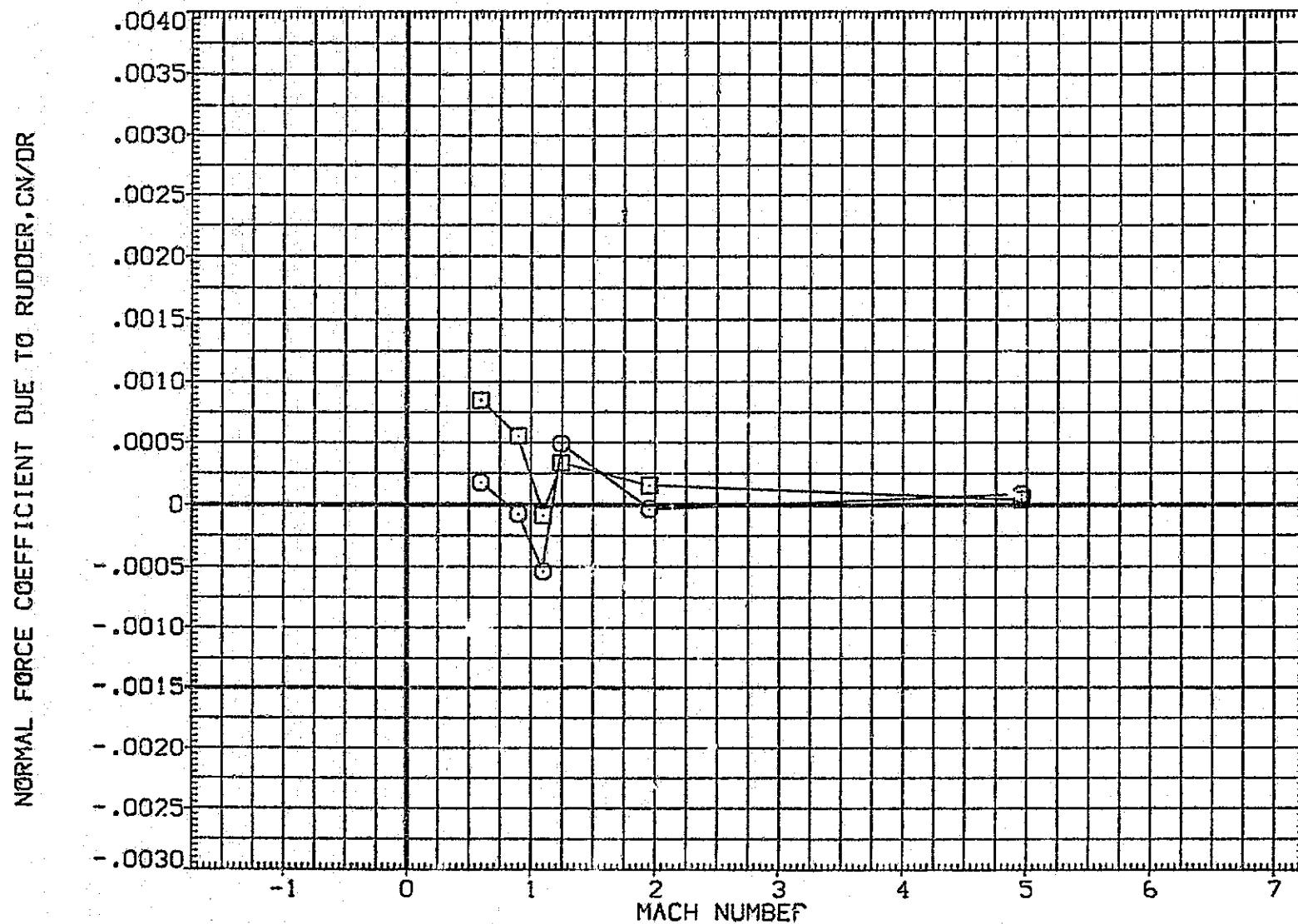


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 CHJALPHA = 4.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (C1C011) MSFC 594(1A33) 740TS (TIP1S1P201)
 (C1C014) MSFC 594(1A33) 740TS (TIP1S1P201)

ORB STING DRUDDR
 ORB STING -15.000
 ORB STING -20.000

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT DUE TO RUDDER, CN/DR

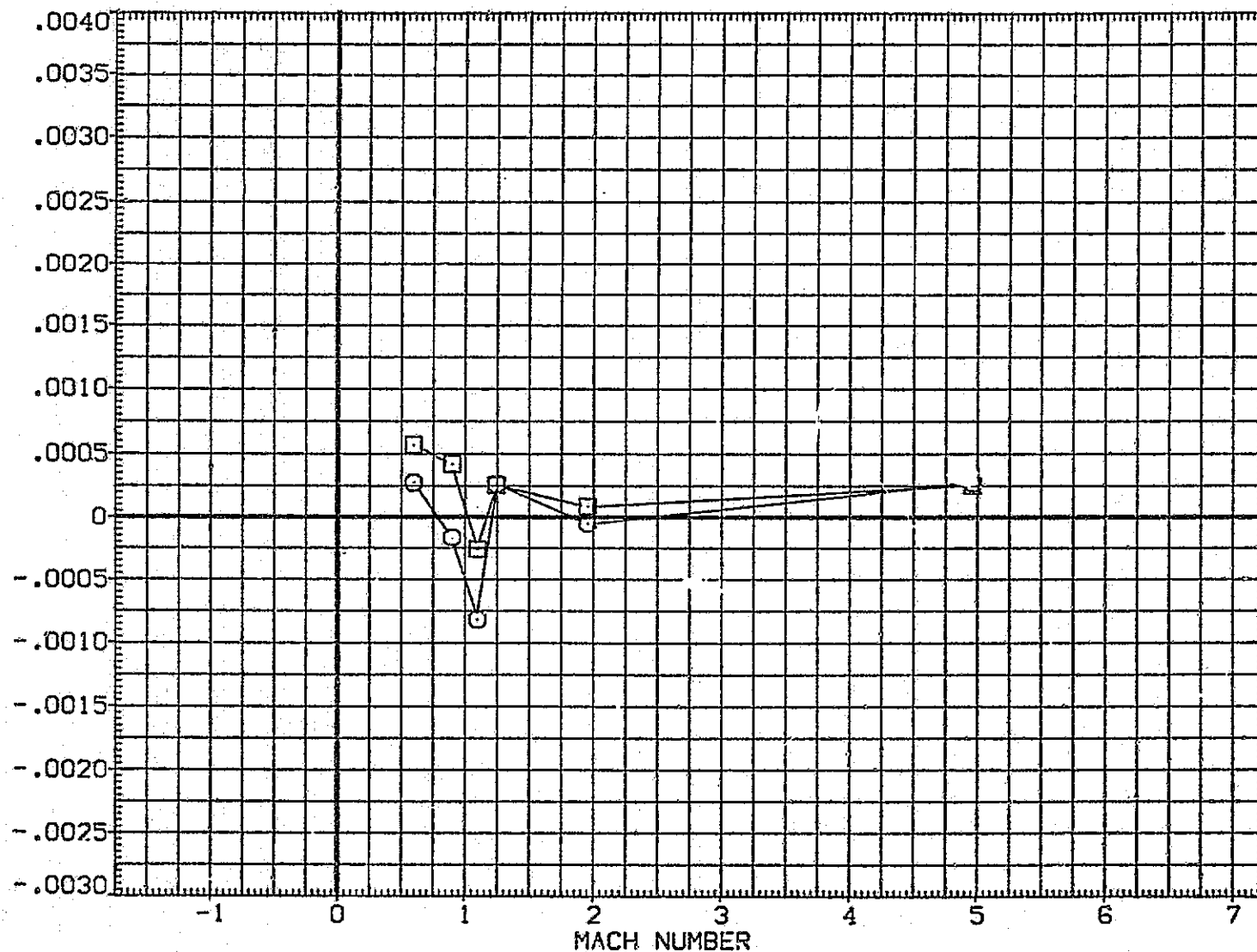


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(1) ALPHA = 6.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (C1C011) 8 MSFC 594(1A33) 740TS (TIP1S1P201)
 (C1C014) 8 MSFC 594(1A33) 740TS (TIP1S1P201)

DRUDOR
 ORB STING -15.000
 ORB STING -20.000

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT DUE TO RUDDER, CN/DR

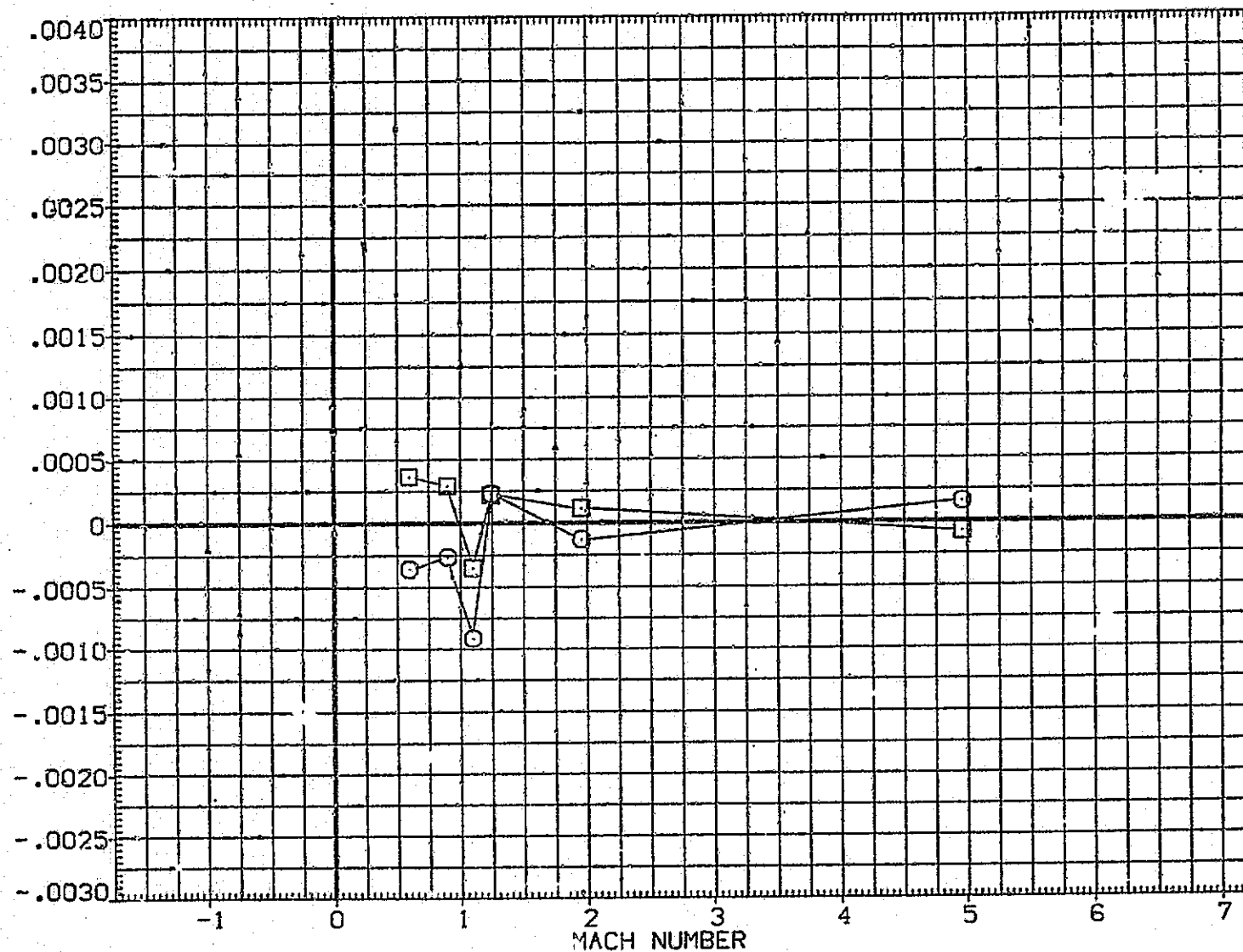


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (J) ALPHA = 8.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 [CIC011] 8 MSFC 594(1A33) 740TS (T1P1S1P201)
 [CIC014] 8 MSFC 594(1A33) 740TS (T1P1S1P201)

ORB STING DRUDDR
 ORB STING -15.000
 ORB STING -20.000

REFERENCE INFORMATION
 SREF 2693.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

NORMAL FORCE COEFFICIENT DUE TO RUDDER, CN/DR

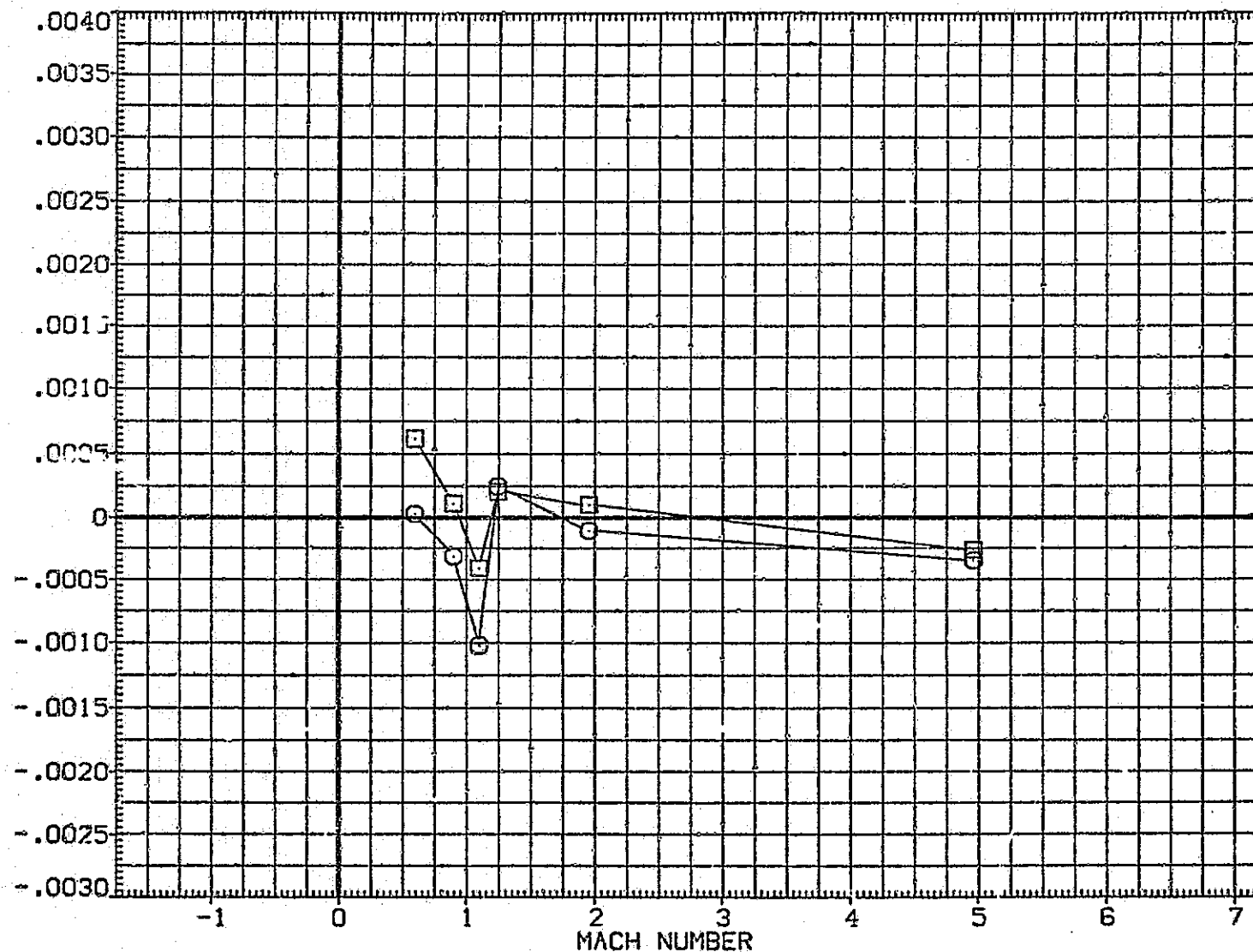


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(K) ALPHA = 10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	DRUDOR
(C1C011) <input type="checkbox"/>	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING -15.000
(C1C014) <input type="checkbox"/>	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING -20.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

PITCHING MOMENT COEFFICIENT DUE TO RUDDER, CLMDR

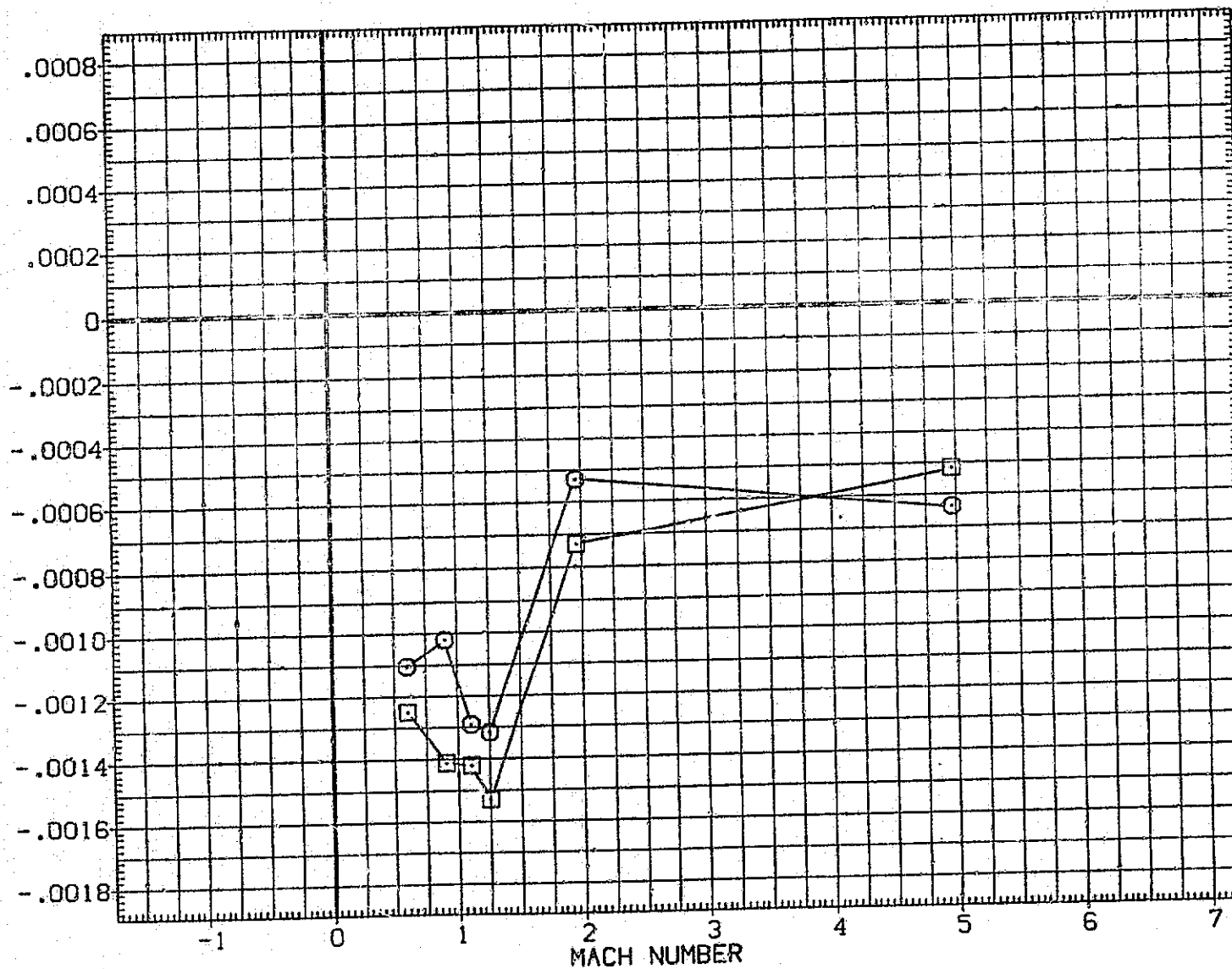


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(A) ALPHA = -10.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (C1C011) \square MSFC 594(1A33) 740TS (TIPISIP201)
 (C1C014) \square MSFC 594(1A33) 740TS (TIPISIP201)

DRUDGR
 ORB STING -15.000
 ORB STING -20.000

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

PITCHING MOMENT COEFFICIENT DUE TO RUDDER, CLMDR

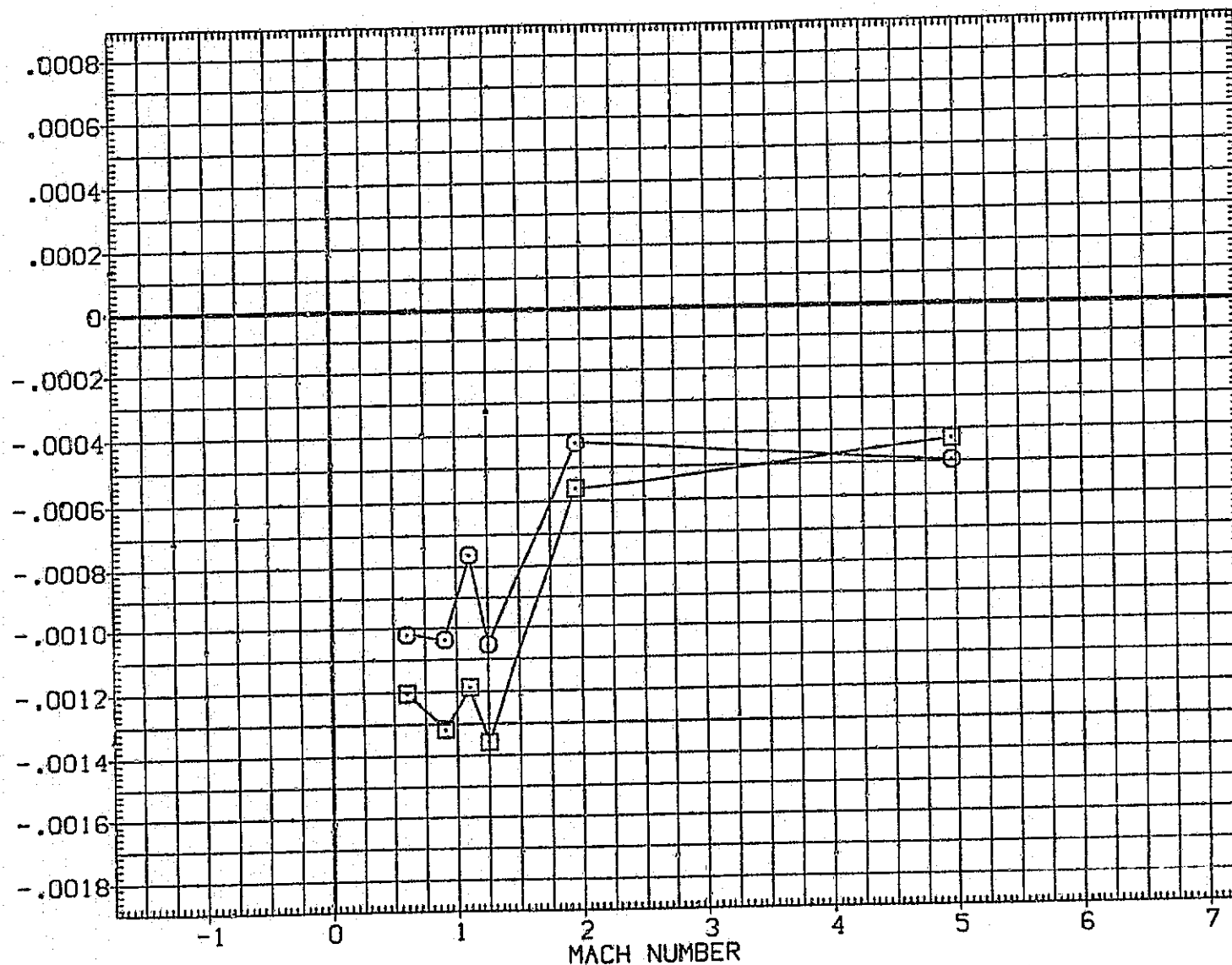


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (B) ALPHA = -8.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	DRUDDR
(CIC011)	MSFC 594(1A33) 740TS (TIPISIP201)	-15.000	
(CIC014)	MSFC 594(1A33) 740TS (TIPISIP201)	-20.000	

REFERENCE INFORMATION		
SREF	2190.0000	IN. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

PITCHING MOMENT COEFFICIENT DUE TO RUDDER CLMDR

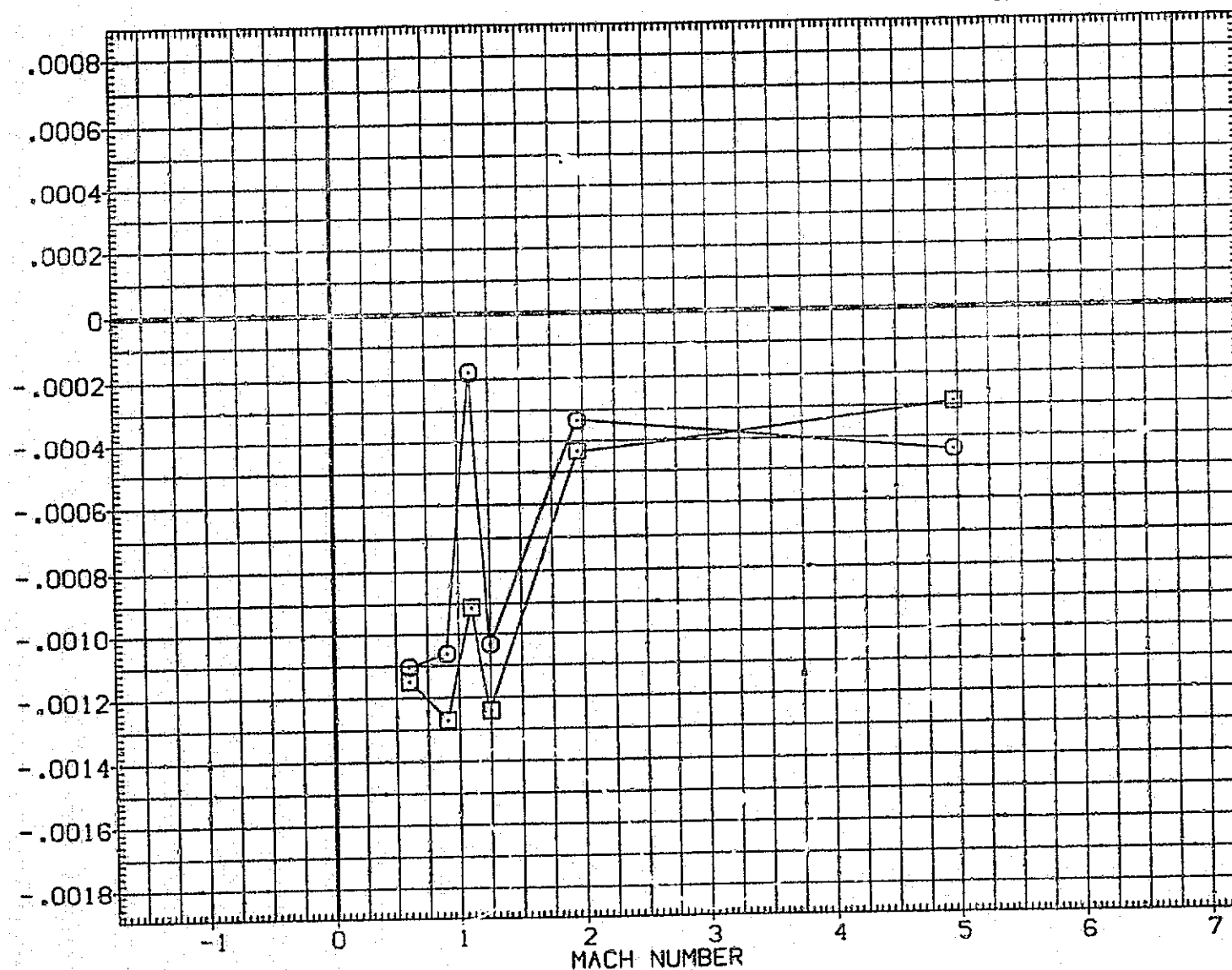


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(C) ALPHA = -6.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (CIC011) ○ MSFC 594(1A33) 740TS (TIPISIP201)
 (CIC014) □ MSFC 594(1A33) 740TS (TIPISIP201)

ORB STING -15.000
 ORB STING -20.000

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

PITCHING MOMENT COEFFICIENT DUE TO RUDDER, CLMDR

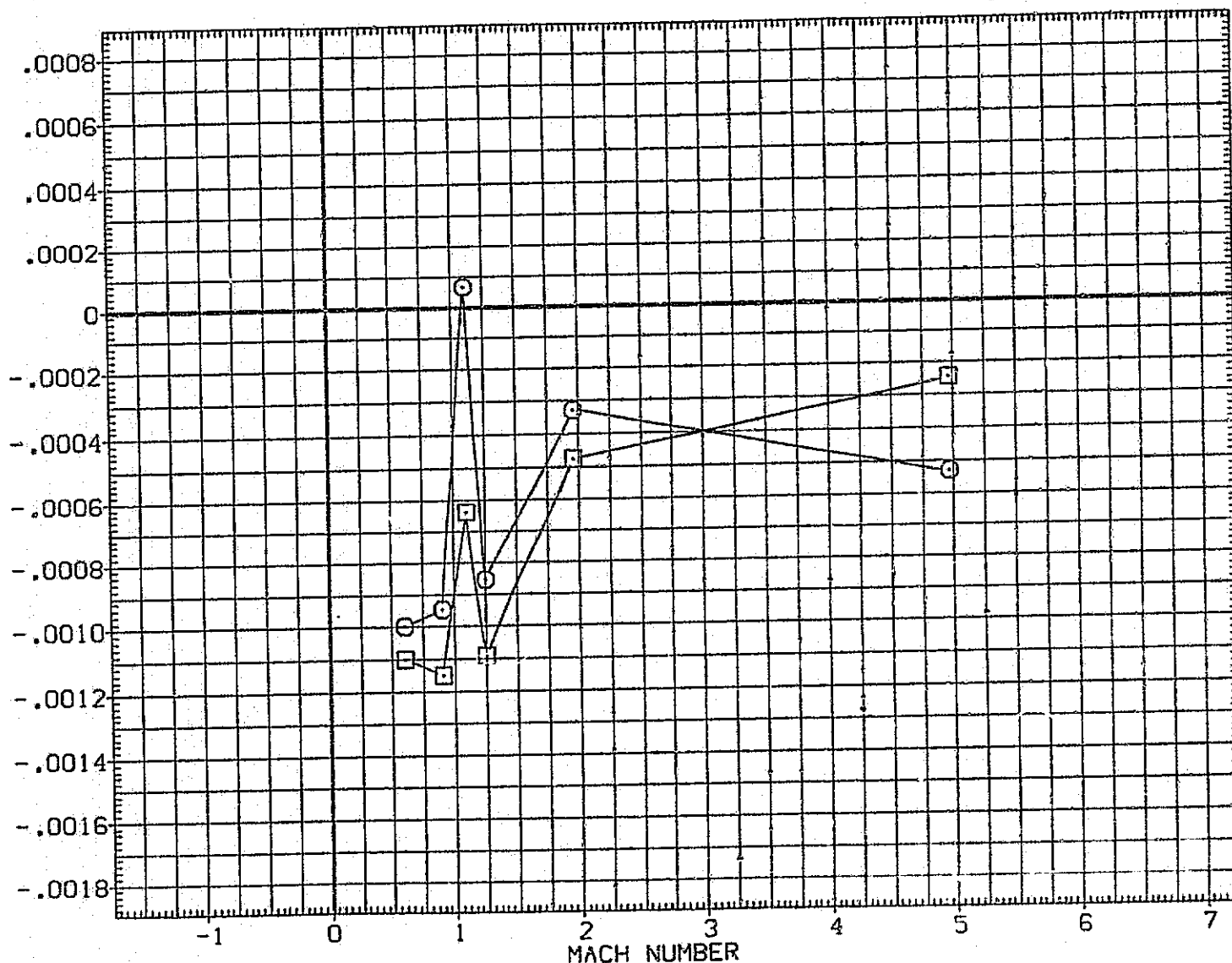


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (D) ALPHA = -4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	DRUDDR
(CIC011)	MSFC 594(1A33) 740TS (TIPISIP201)	-15.000	
(CIC014)	MSFC 594(1A33) 740TS (TIPISIP201)	-20.000	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. YT
SCALE	.0040	

PITCHING MOMENT COEFFICIENT DUE TO RUDDER, CLMDR

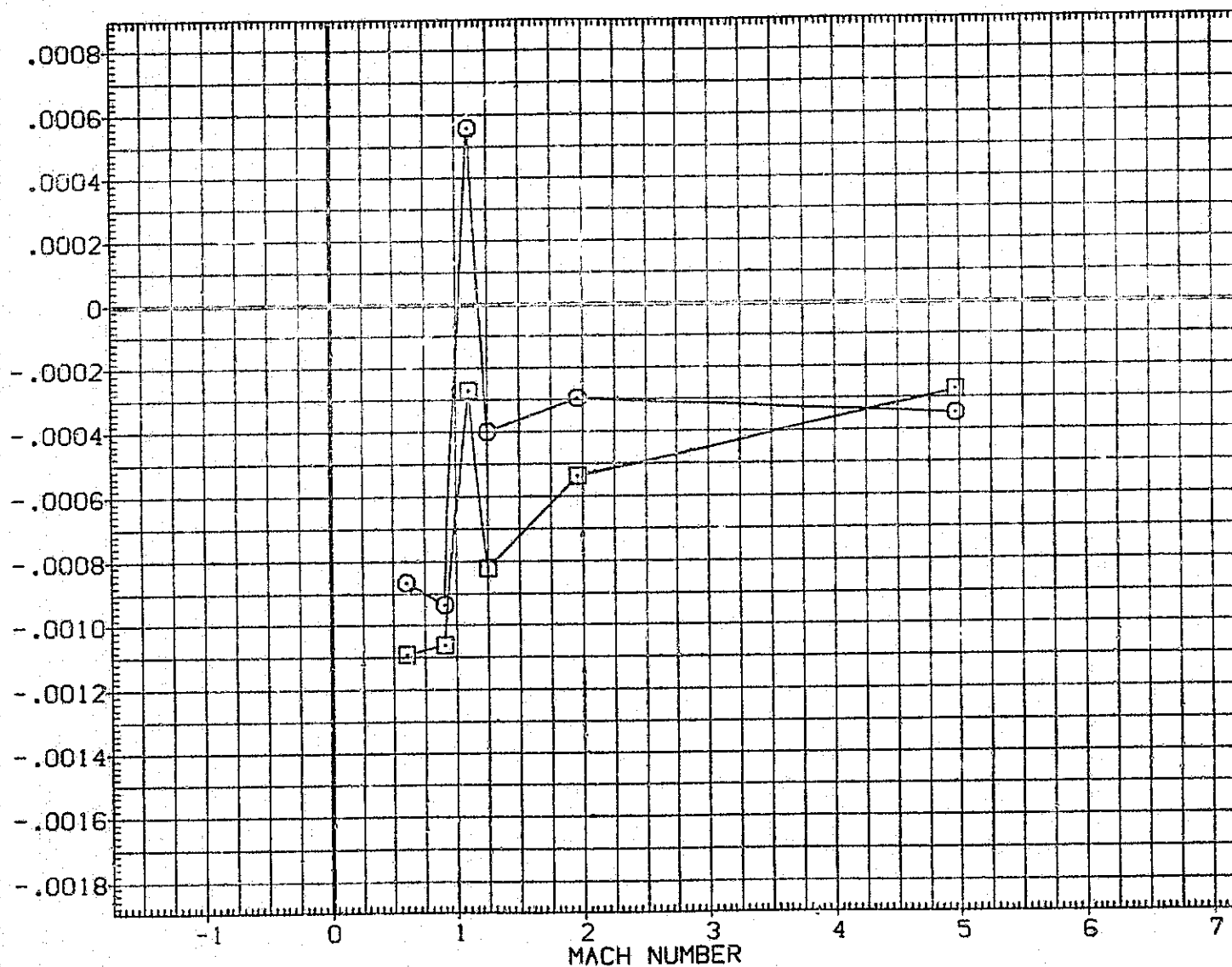


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(E) ALPHA = -2.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (C1C011) ☐ MSFC 594(1A33) 740TS (TIPISIP201)
 (C1C014) ☐ MSFC 594(1A33) 740TS (TIPISIP201)

ORB STING -15.000
 ORB STING -20.000

DRUDDR

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

PITCHING MOMENT COEFFICIENT DUE TO RUDDER, CLMDR

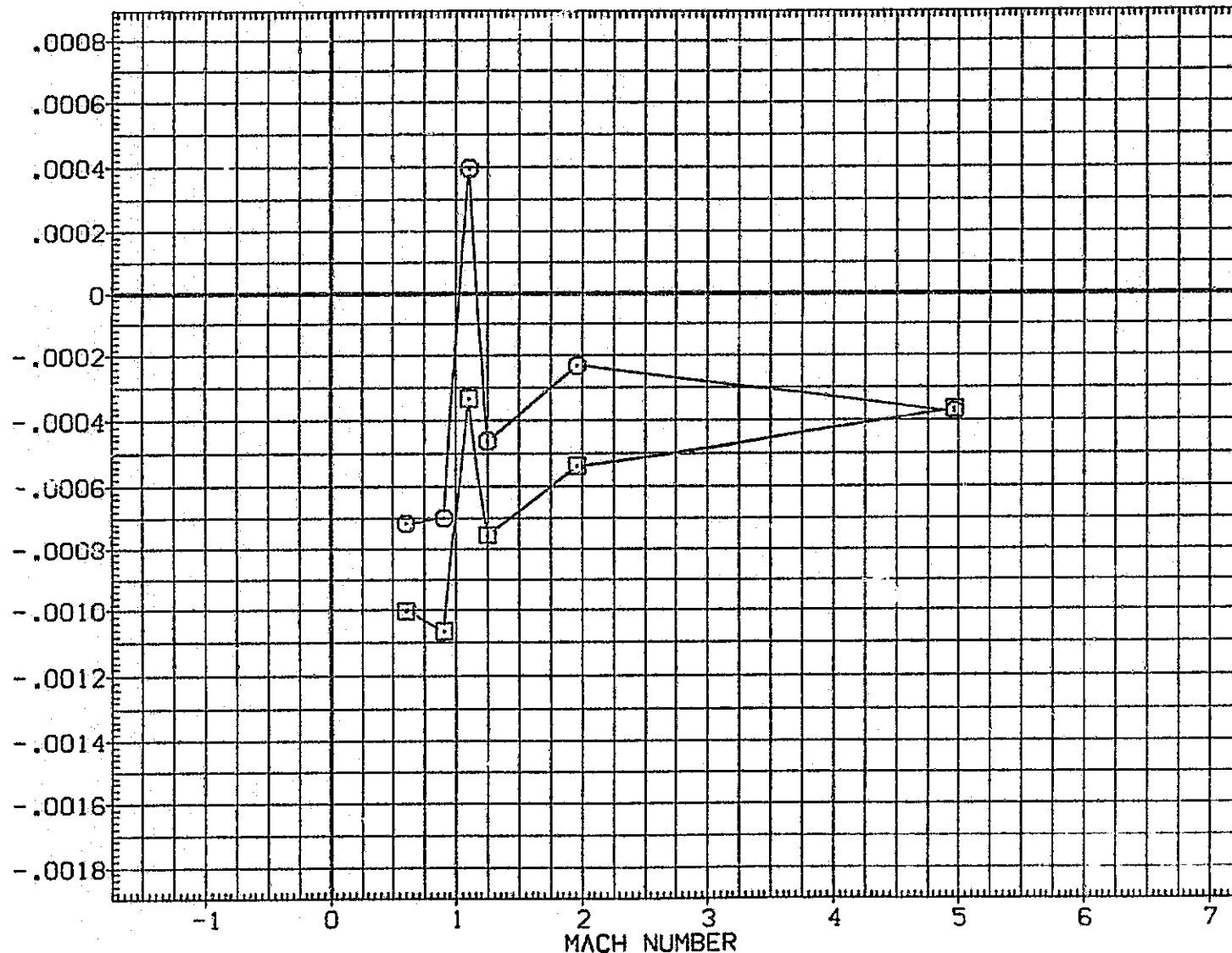


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(F)ALPHA = .00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	DRUDDR
(CIC011)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING -15.000
(CIC014)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING -20.000

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

PITCHING MOMENT COEFFICIENT DUE TO RUDDER, CLMDR

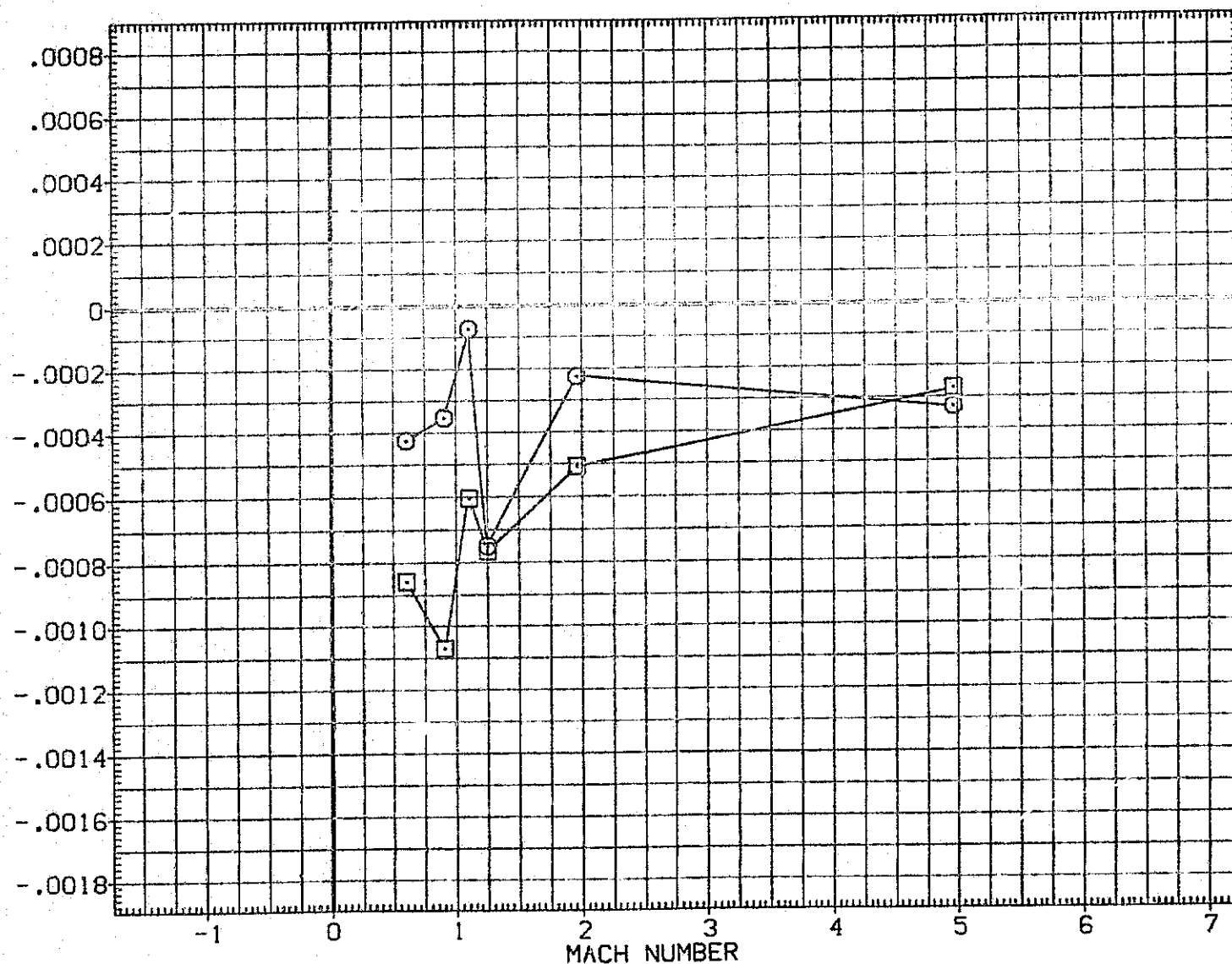


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(G) ALPHA = 2.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (CIC011) ☐ MSFC 594(1A33) 740TS (TIPISIP201)
 (CIC014) ☐ MSFC 594(1A33) 740TS (TIPISIP201)

DRUDDR
 ORB STING -15.000
 ORB STING -20.000

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

PITCHING MOMENT COEFFICIENT DUE TO RUDDER, CLMDR

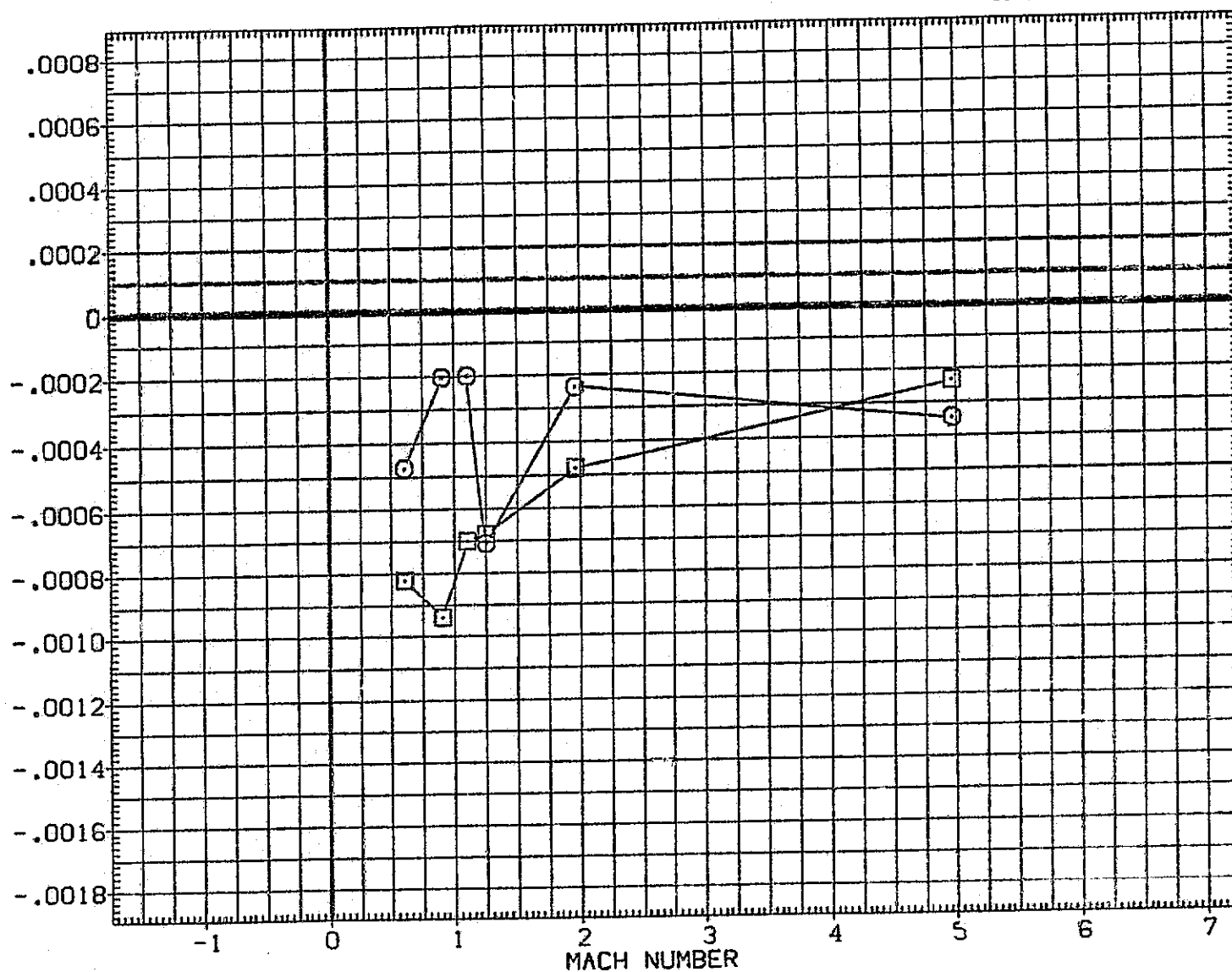


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (H)ALPHA = 4.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	DRUOR
(CIC011)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	-15.000
(CIC014)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	-20.000

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

PITCHING MOMENT COEFFICIENT DUE TO RUDDER, CLMDR

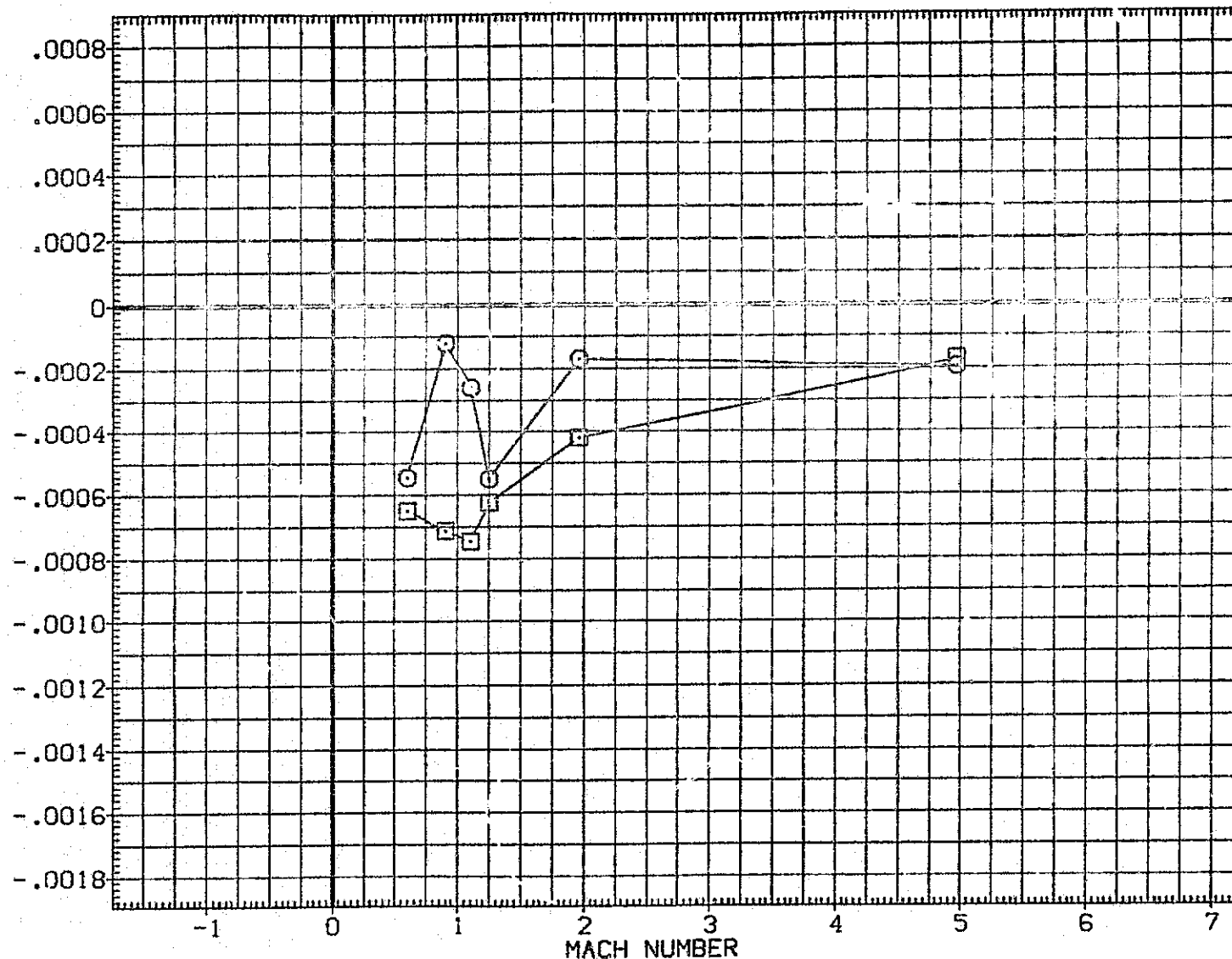


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(1) ALPHA = 6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	DRUDDR
(CIC011) <input type="checkbox"/>	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING -15.000
(CIC014) <input type="checkbox"/>	MSFC 594(1A33) 740TS (TIP1SIP201)	ORB STING -20.000

REFERENCE INFORMATION		
SREF	2699.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

PITCHING MOMENT COEFFICIENT DUE TO RUDDER, CLMDR

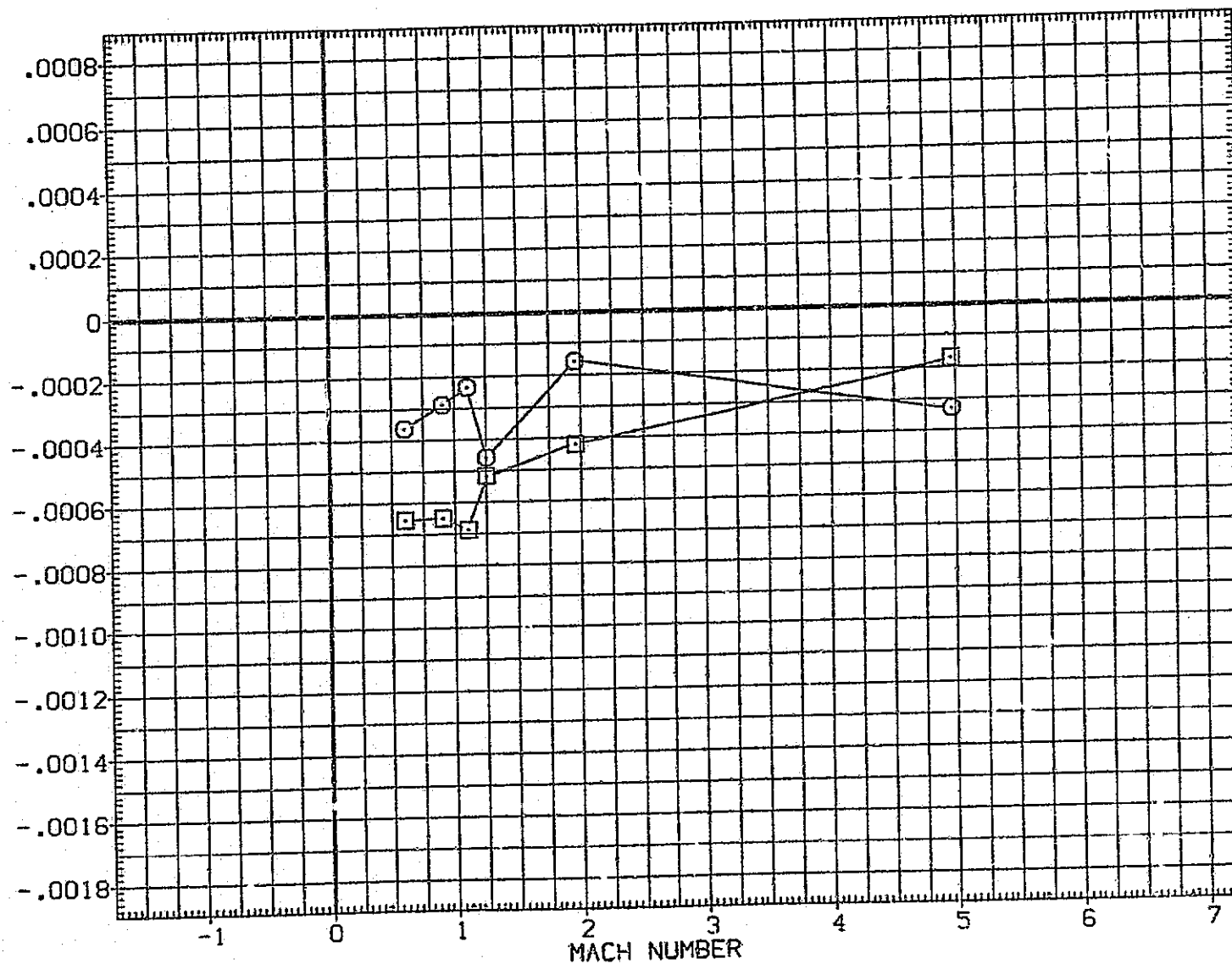


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(J) ALPHA = 8.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (CIC011) \square MSFC 594(1A33) 740TS (TIP1SIP201)
 (CIC014) \square MSFC 594(1A33) 740TS (TIP1SIP201)

DRUDDR
 ORB STING -15.000
 ORB STING -20.000

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

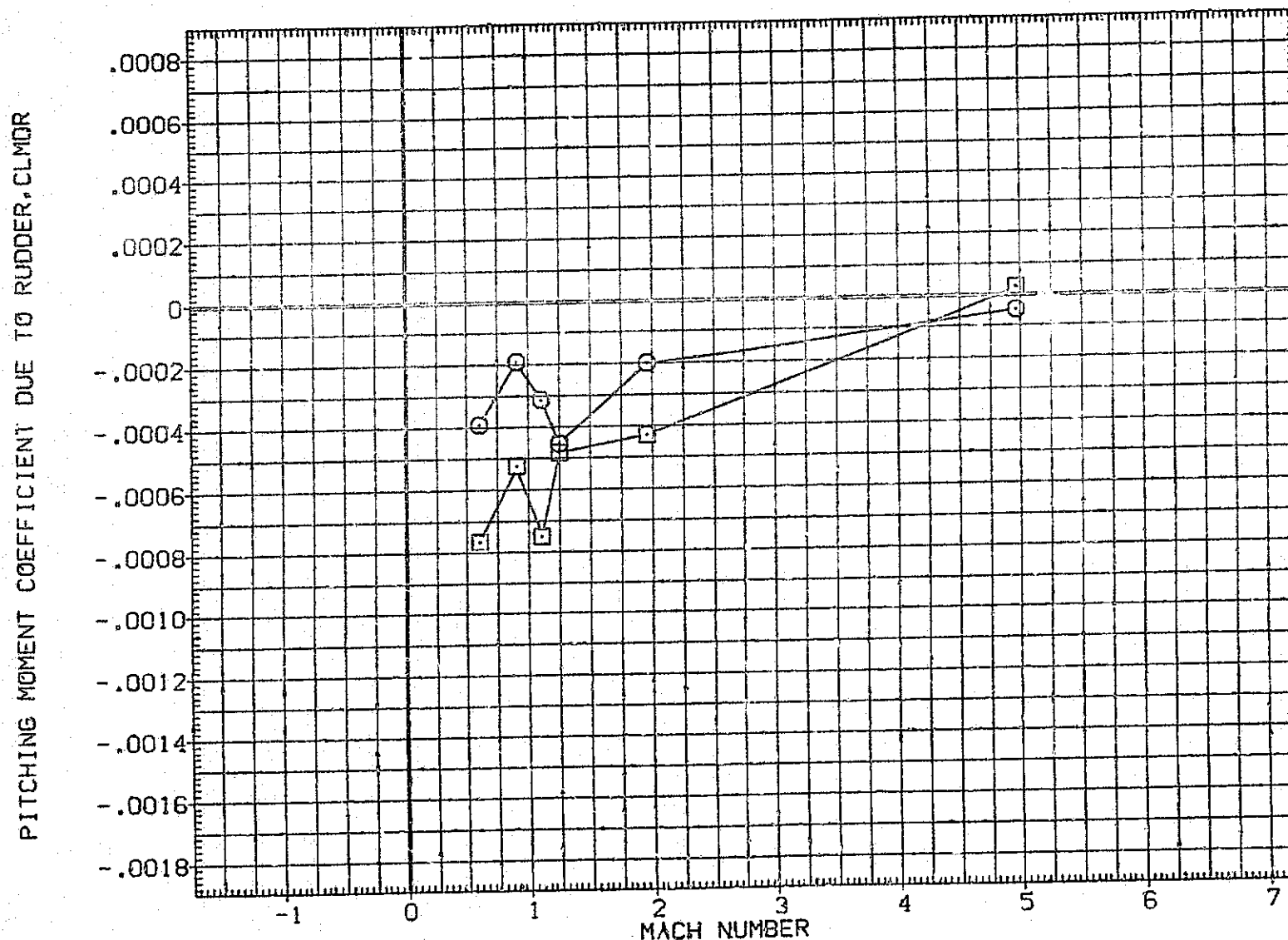


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (K)ALPHA = 10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	DRUDDR
(CIC011) ○	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING -15.000
(CIC014) □	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING -20.000

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT DUE TO RUDDER, C_{AFDR}

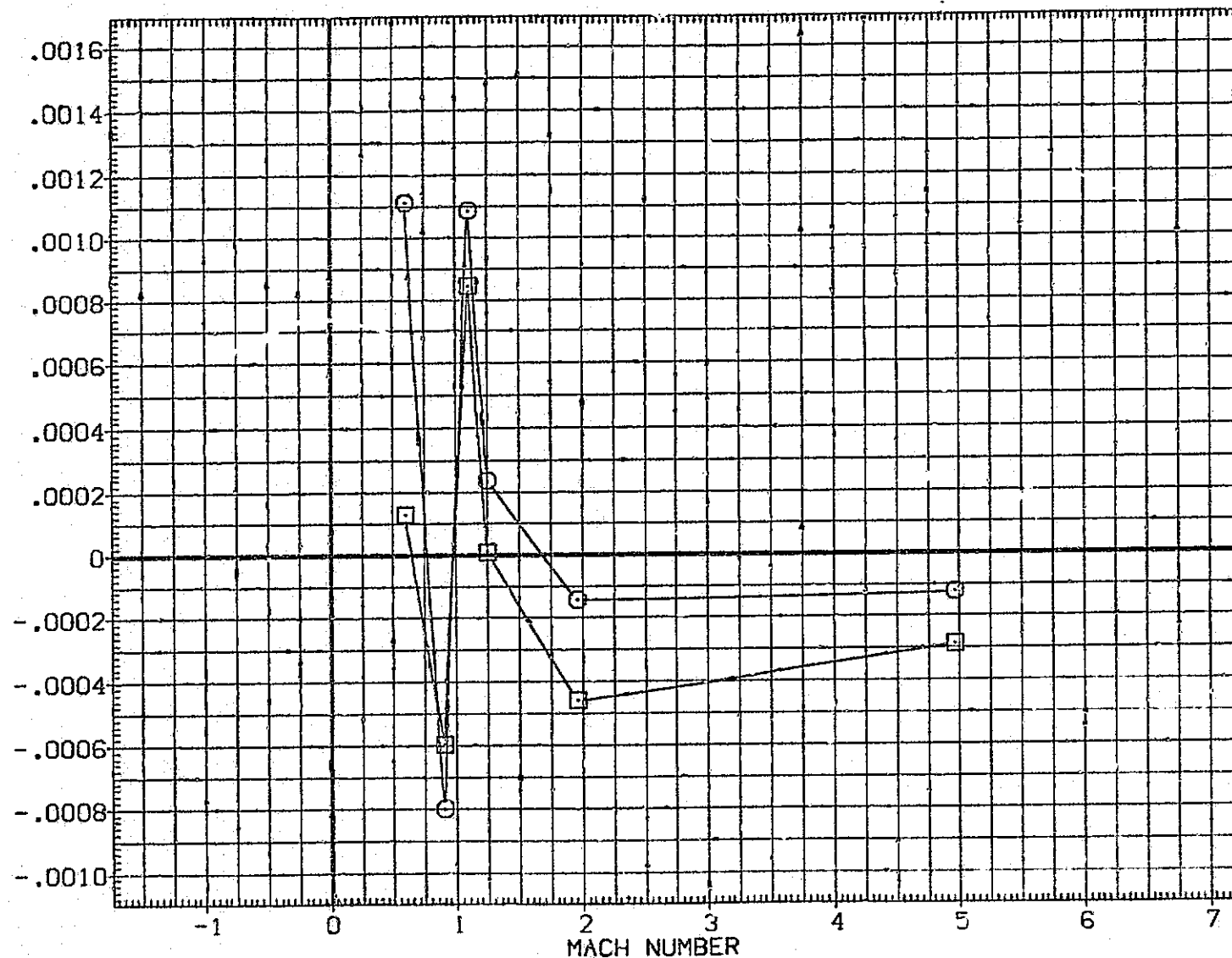


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(A) ALPHA = -10.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	ORUDOR
(CIC011)	MSFC 594(1A33) 740TS (TIPISIP201)	-15.000	
(CIC014)	MSFC 594(1A33) 740TS (TIPISIP201)	-20.000	

REFERENCE INFORMATION		
SREF	2690.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

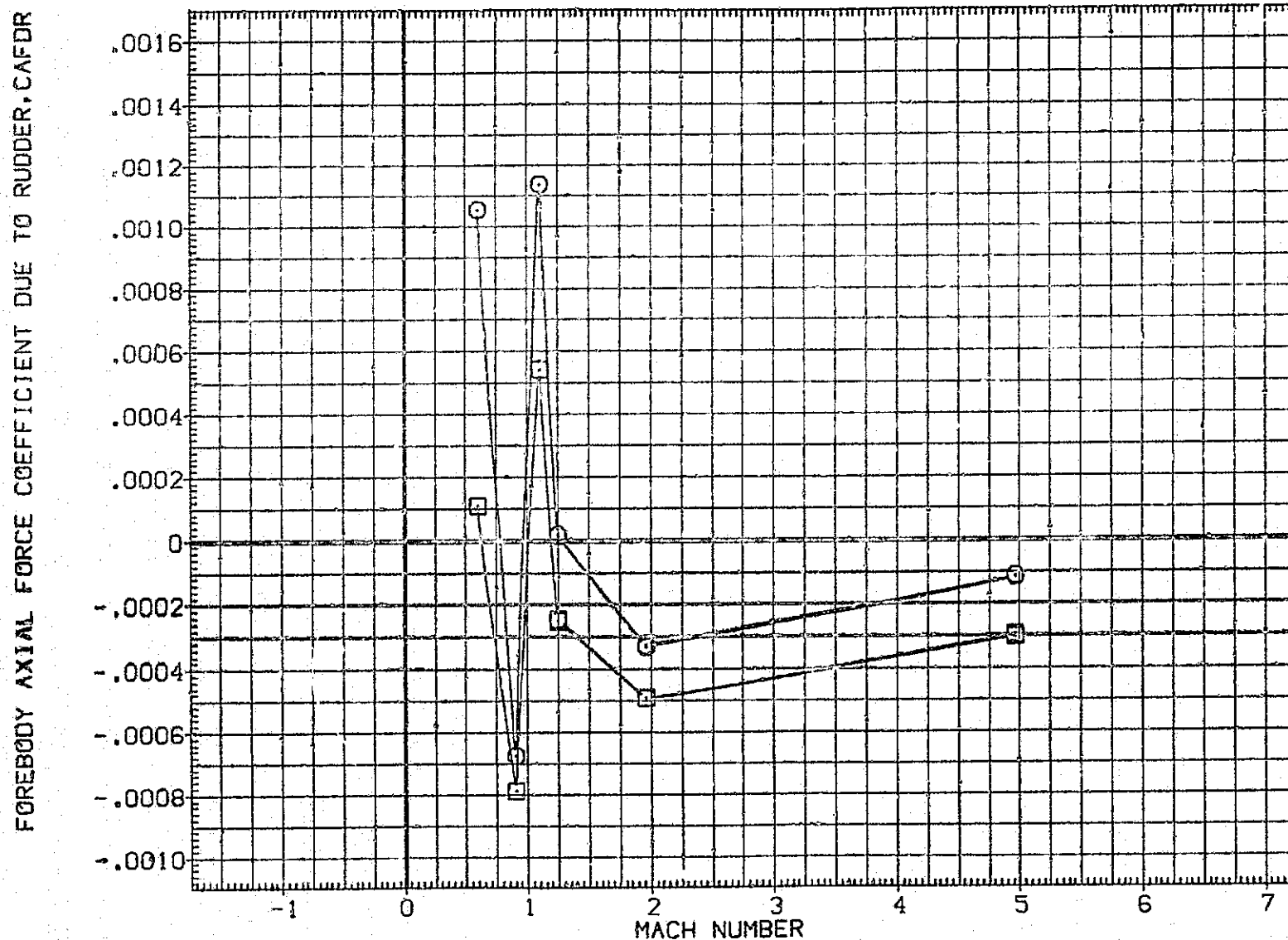


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(B) ALPHA = -8.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (CICD11) ☐ MSFC 594(1A33) 740TS (TIPISIP201)
 (CICD14) ☐ MSFC 594(1A33) 740TS (TIPISIP201)

ORB STING -15.000
 ORB STING -20.000

DRUDDR

REFERENCE INFORMATION

SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT DUE TO RUDDER, CAFDR

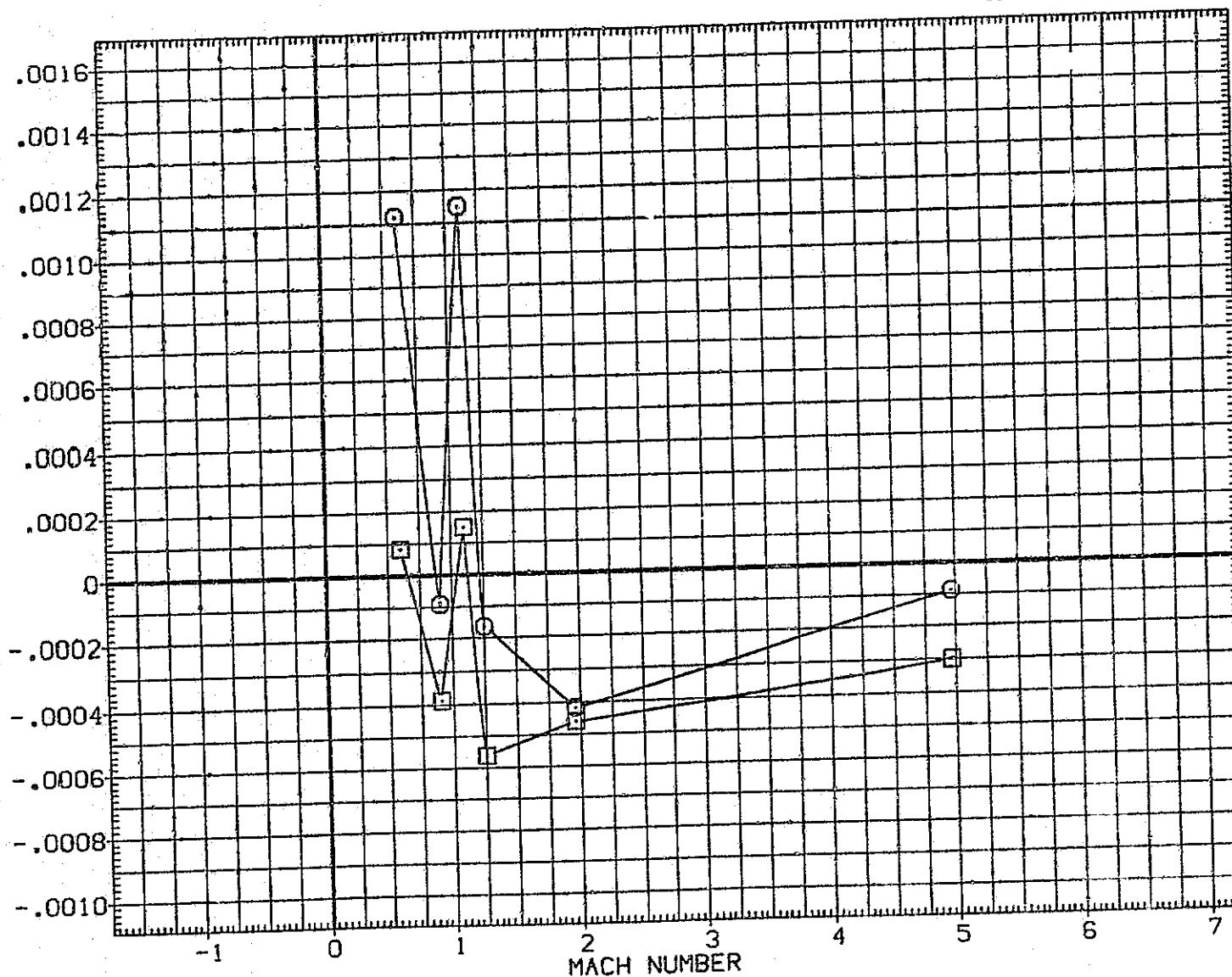


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (C)ALPHA = -6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	DRUOR
(CIC011)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	-15.000
(CIC014)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING	-20.000

REFERENCE INFORMATION		
SREF	2590.0000	50. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

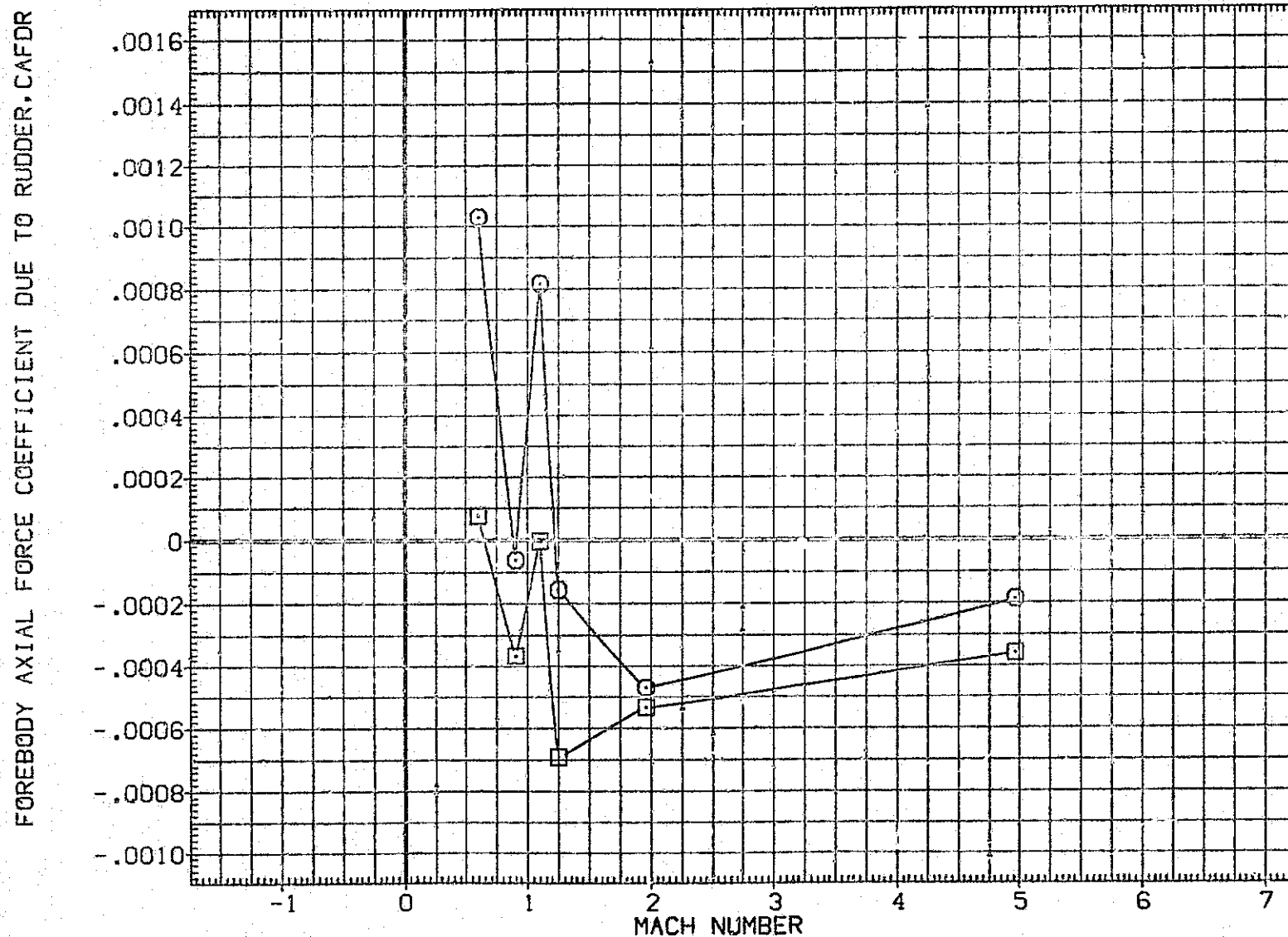


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(D) ALPHA = -4.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (CIC011) \square MSFC 594(1A33) 740TS (T1P1S1P201)
 (CIC014) \square MSFC 594(1A33) 740TS (T1P1S1P201)

ORB STING -15.000
 ORB STING -20.000

DRUDDR

REFERENCE INFORMATION

CREP 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT DUE TO RUDDER, CAFDR

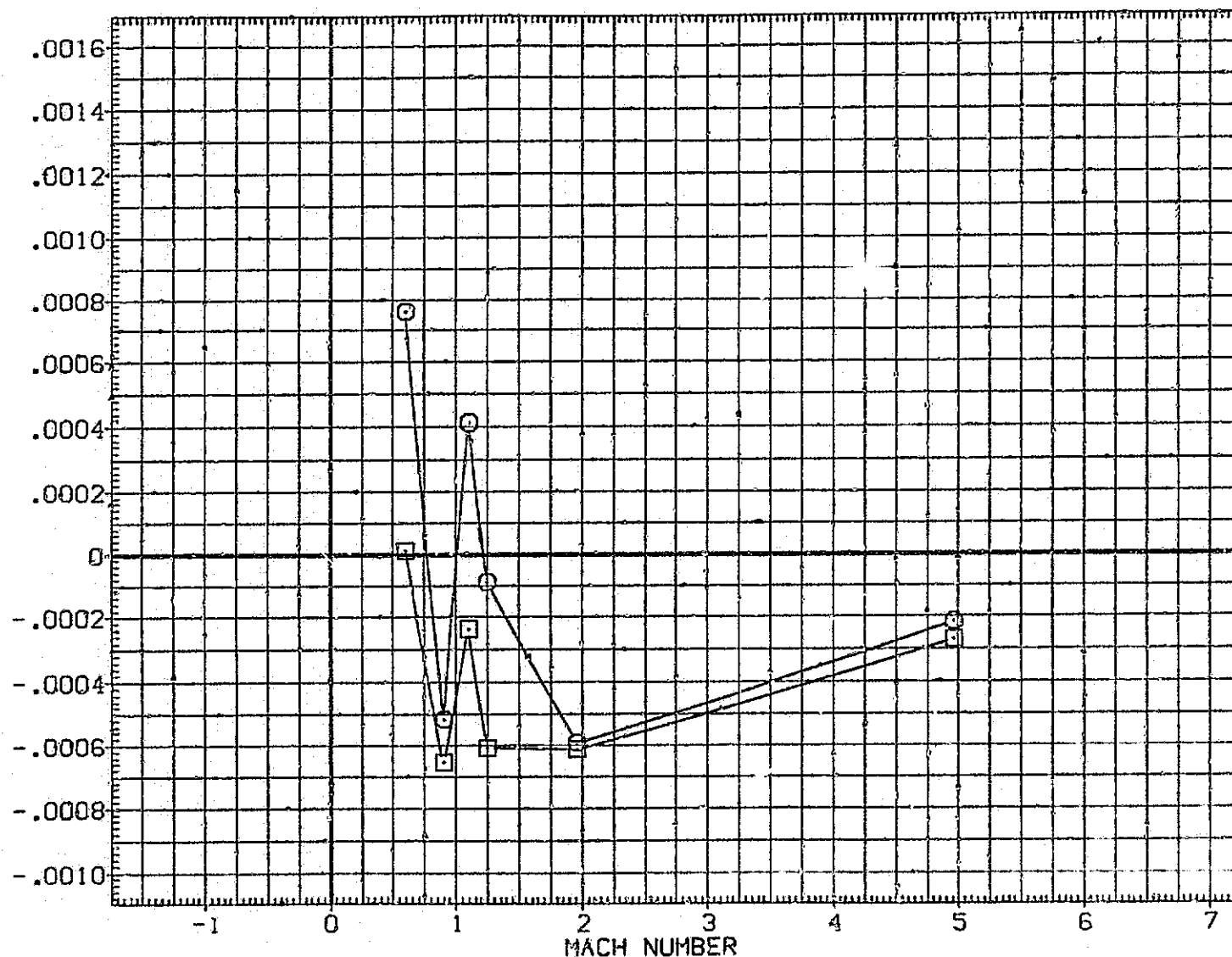


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (E) ALPHA = -2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORR STING	ORROR
(CIC011)	MSFC 594(1A33) 740TS (TIP:SIIP201)	-15.000	
(CIC014)	MSFC 594(1A33) 740TS (TIP:SIIP201)	-20.000	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRF	976.0000	IN. XT
YMRF	.0000	IN. YT
ZMRF	400.0000	IN. ZT
SCALE	.0040	

FOREBODY AXIAL FORCE COEFFICIENT DUE TO RUDDER, CAFOR

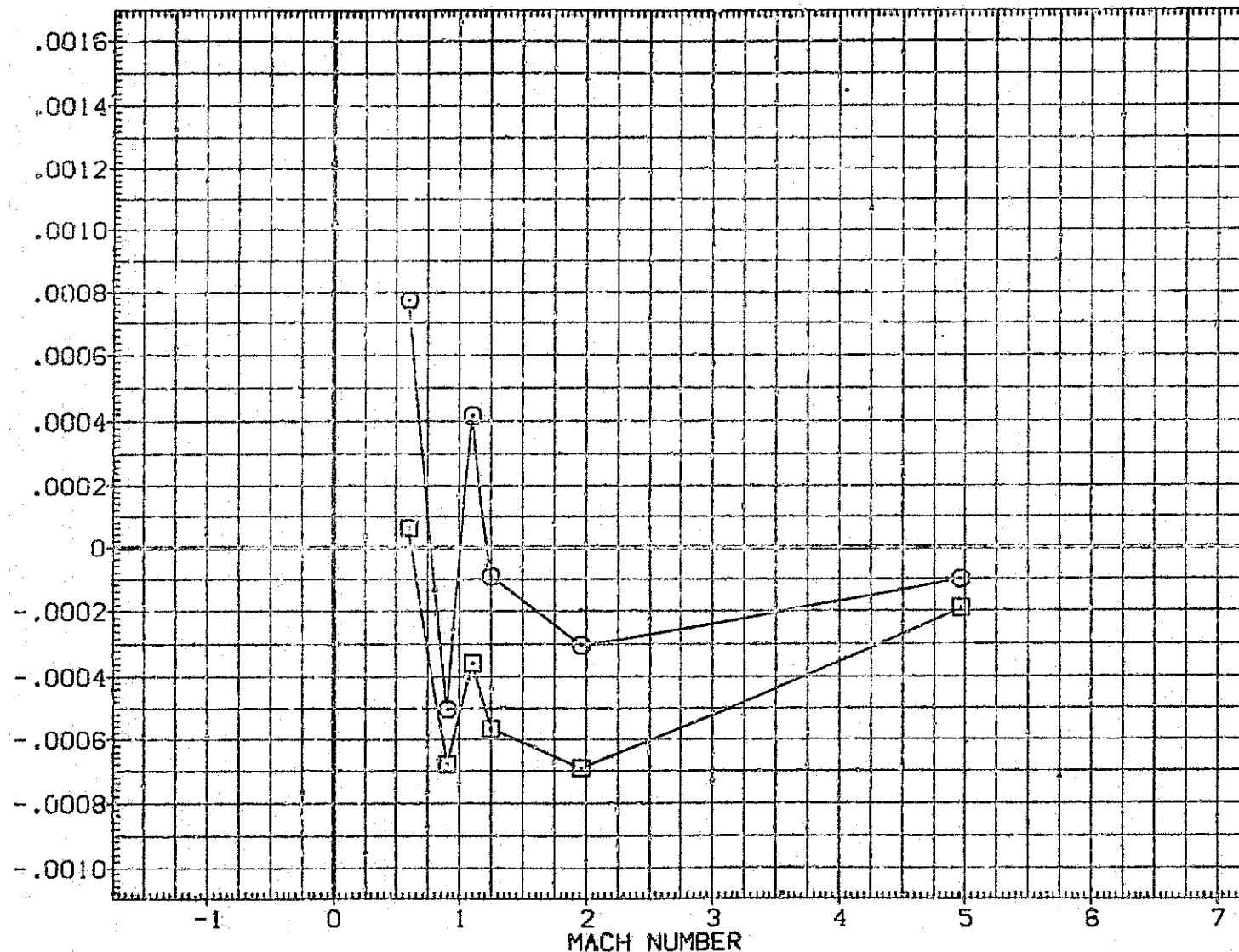


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
(F) ALPHA = .00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (CIC011) \square MSFC 594(1A33) 740TS (TIP1SIP201)
 (CIC014) \square MSFC 594(1A33) 740TS (TIP1SIP201)

ORR STING -15.000
 ORR STING -20.000

ORR STING

REFERENCE INFORMATION
 SREF 2650.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT DUE TO RUDDER, CA_{FR}

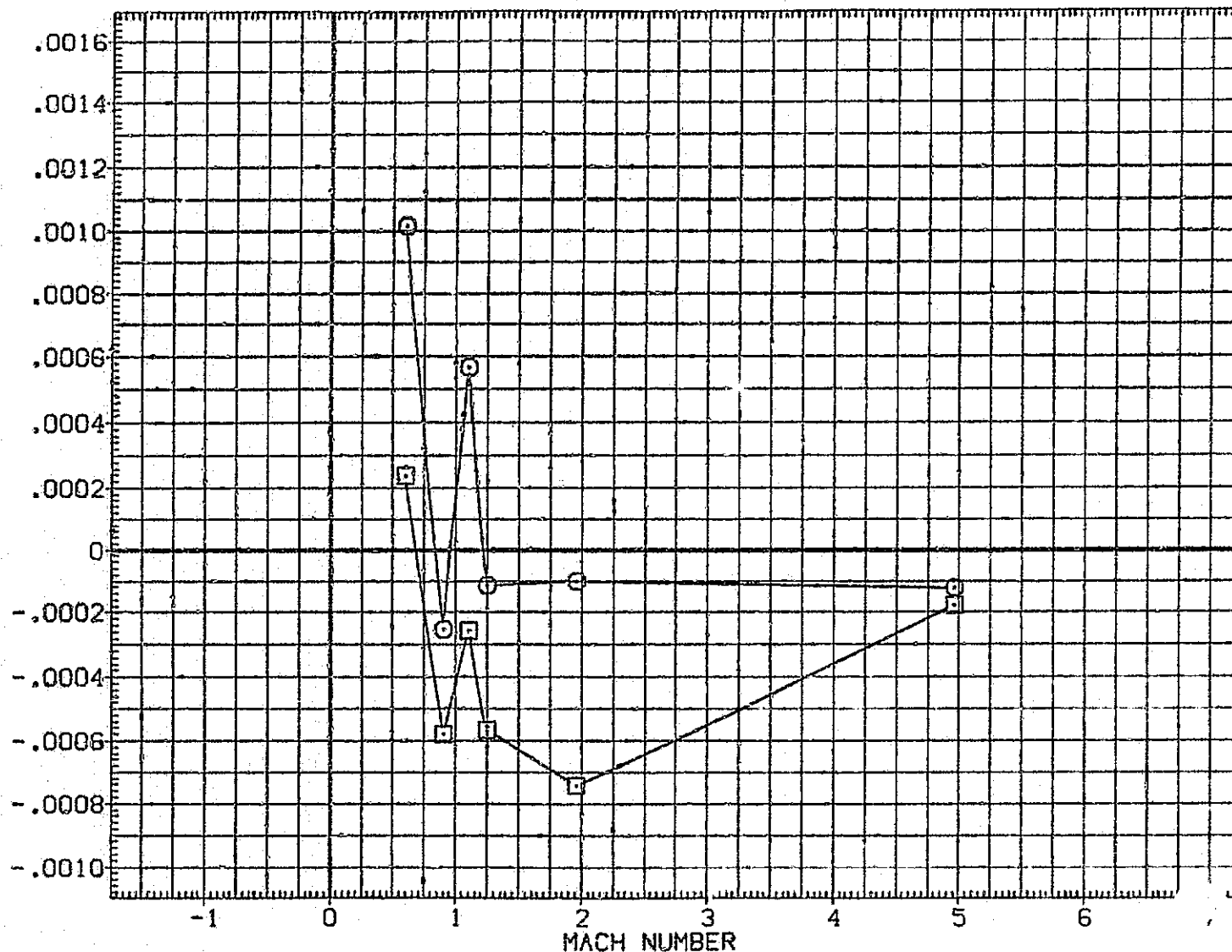


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (G) ALPHA = 2.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	DRUDDR
(CICO11)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING -15.000
(CICO14)	MSFC 594(1A33) 740TS (TIPISIP201)	ORB STING -20.000

REFERENCE INFORMATION		
SREF	2690.0000	SO. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

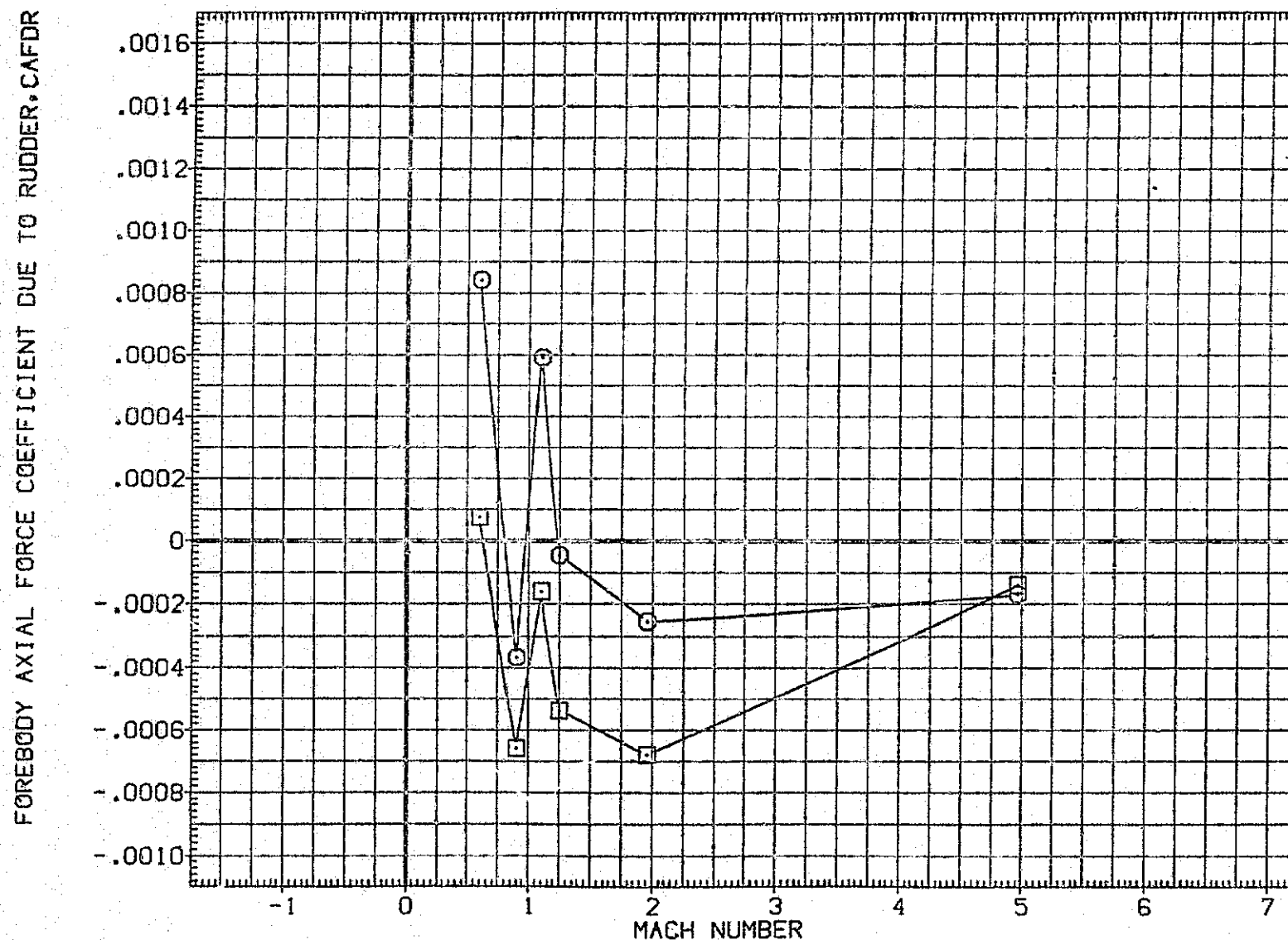


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(H) ALPHA = 4.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (CIC011) MSFC 594(1A33) 740TS (TIPISIP201)
 (CIC014) MSFC 594(1A33) 740TS (TIPISIP201)

ORB STING -15.000
 ORB STING -20.000

DRUDDR

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT DUE TO RUDDER, CAFDR

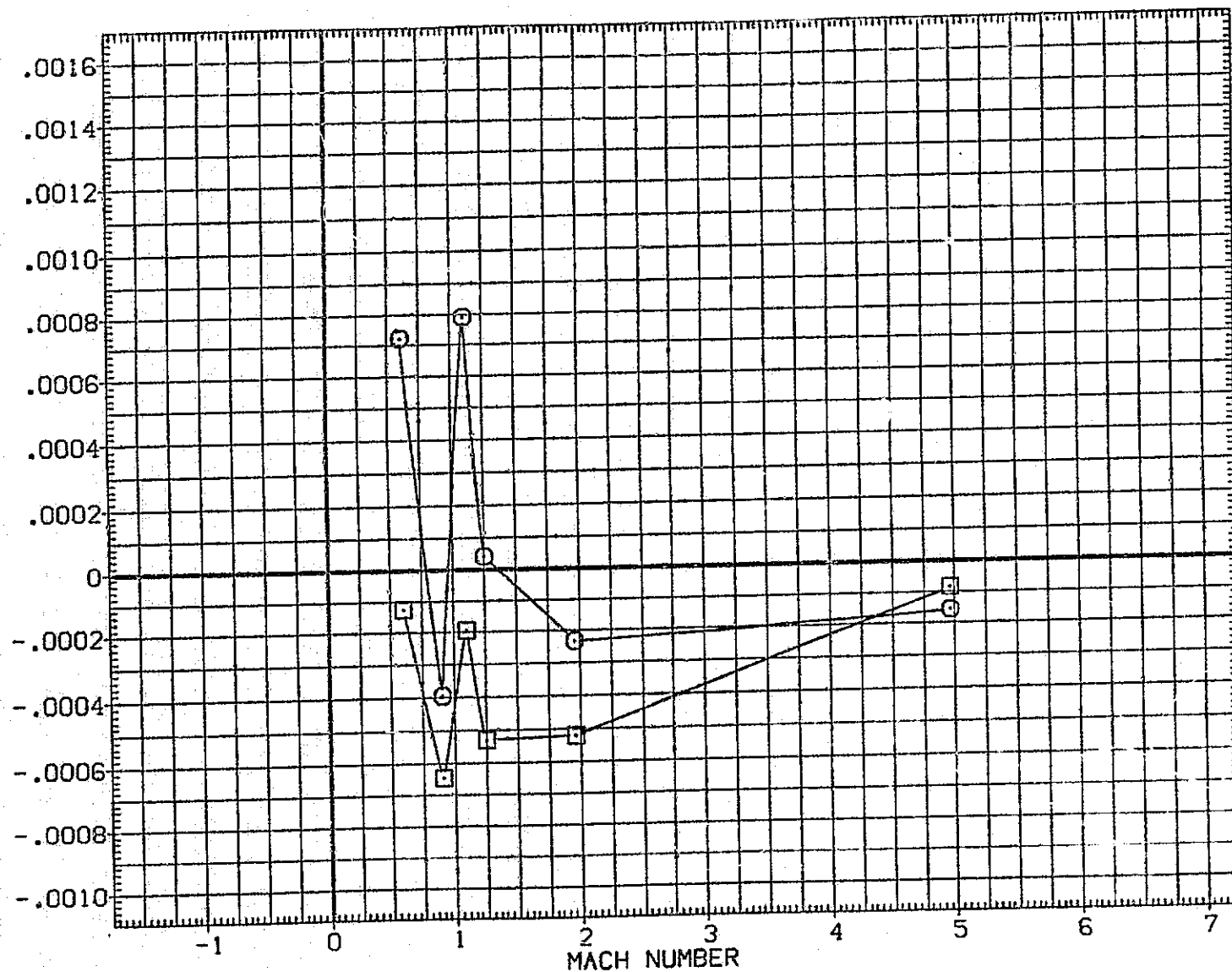


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (1) ALPHA = 6.00

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ORB STING	DRUDDR
(CIC011)	MSFC 594(1A33) 740TS (TIPISIP201)	-15.000	
(CIC014)	MSFC 594(1A33) 740TS (TIPISIP201)	-20.000	

REFERENCE INFORMATION		
SREF	2690.0000	SQ. FT
LREF	1290.0000	IN.
BREF	1290.0000	IN.
XMRP	976.0000	IN. XT
YMRP	.0000	IN. YT
ZMRP	400.0000	IN. ZT
SCALE	.0040	

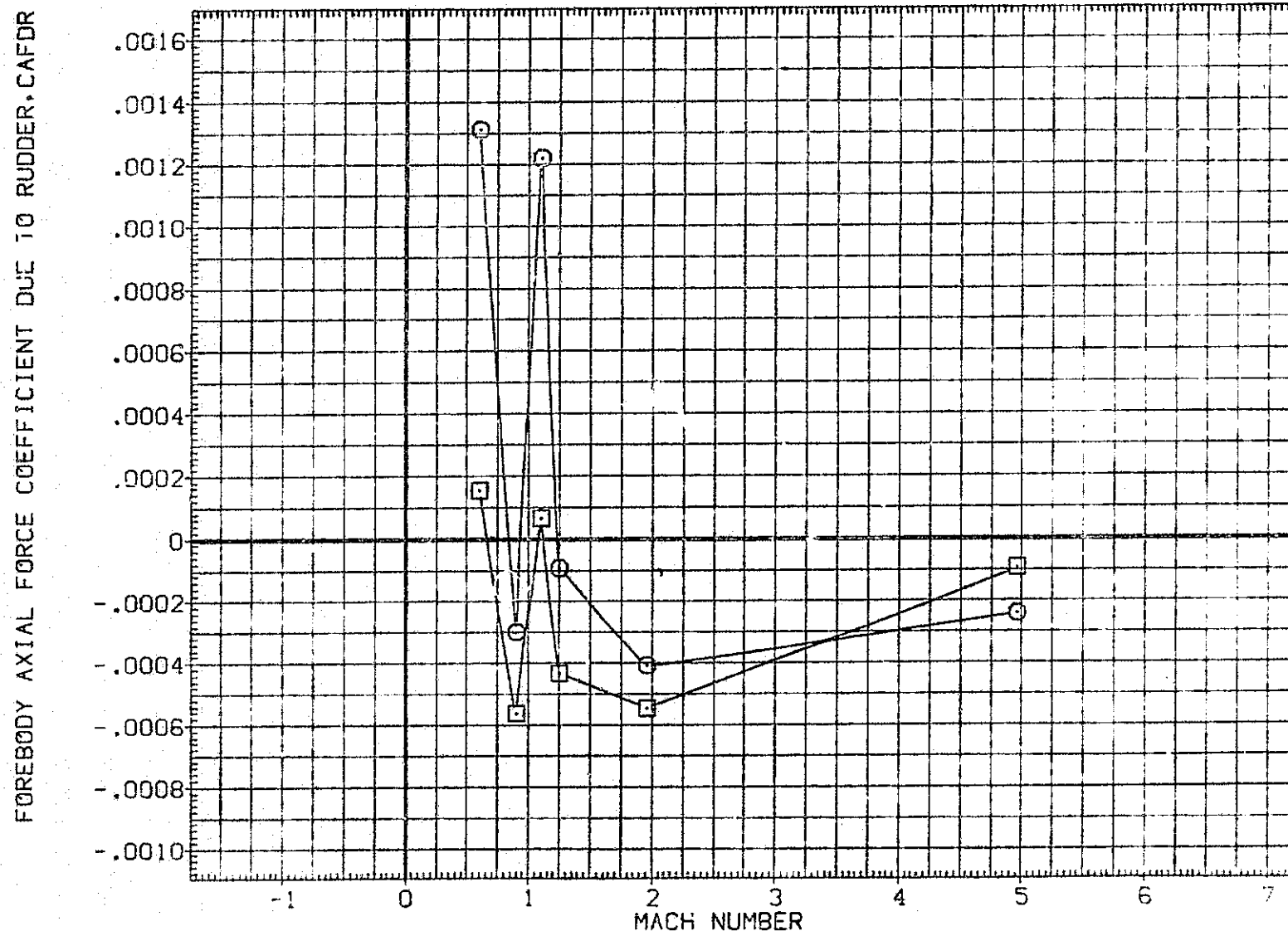


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE

(J) ALPHA = 8.00

DATA SET SYMBOL CONFIGURATION DESCRIPTION
 (CIC011) ☐ MSFC S94(1A33) 740TS (TIP)SIP201
 (CIC014) ☐ MSFC S94(1A33) 740TS (TIP)SIP201

DRUDDR
 DRB STING -15.000
 DRB STING -20.000

REFERENCE INFORMATION
 SREF 2690.0000 SQ. FT
 LREF 1290.0000 IN.
 BREF 1290.0000 IN.
 XMRP 976.0000 IN. XT
 YMRP .0000 IN. YT
 ZMRP 400.0000 IN. ZT
 SCALE .0040

FOREBODY AXIAL FORCE COEFFICIENT DUE TO RUDDER, CAFDR

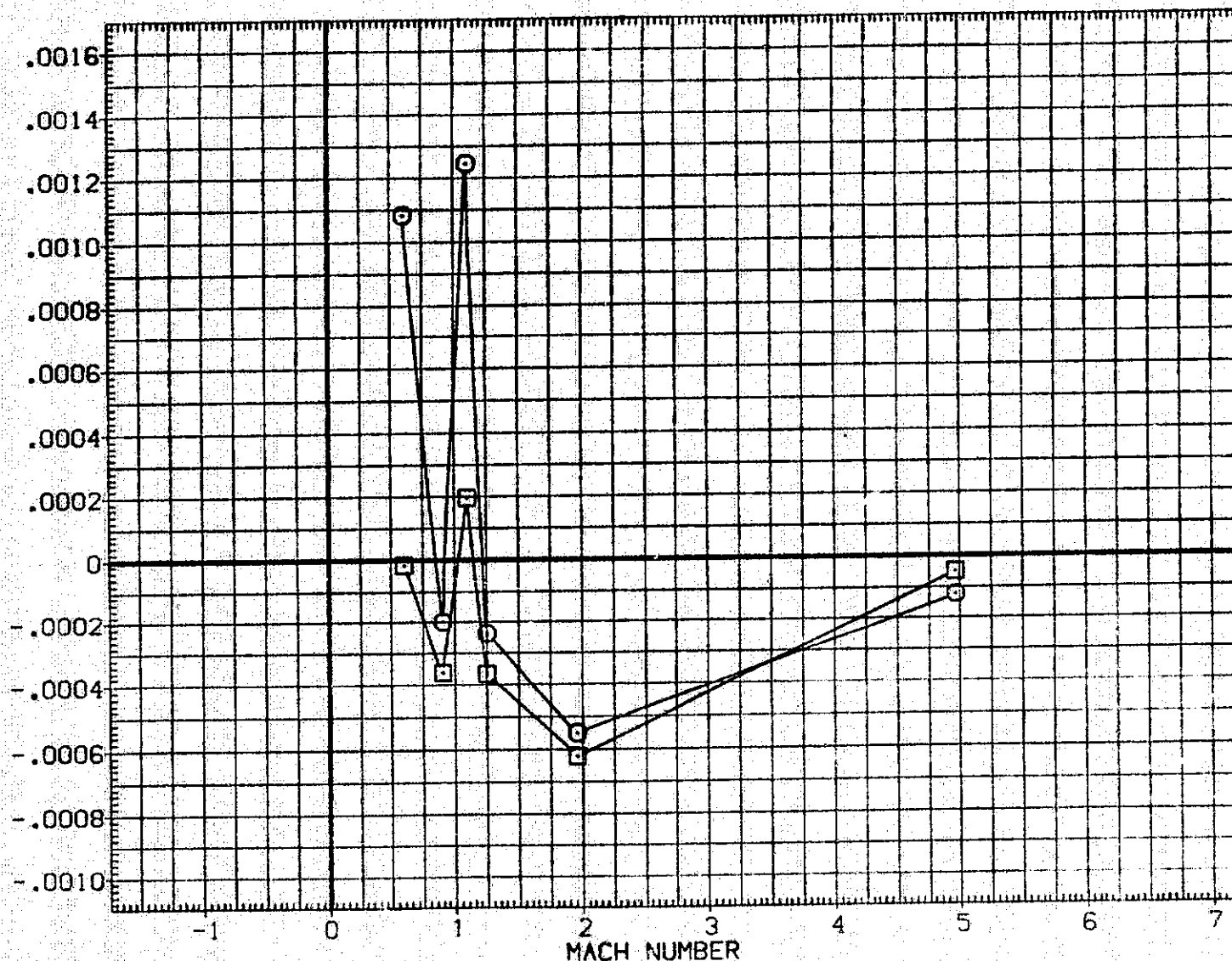


FIG 12 LONGITUDINAL RUDDER DEFLECTION EFFECTS-FIRST STAGE
 (K) ALPHA = 10.00